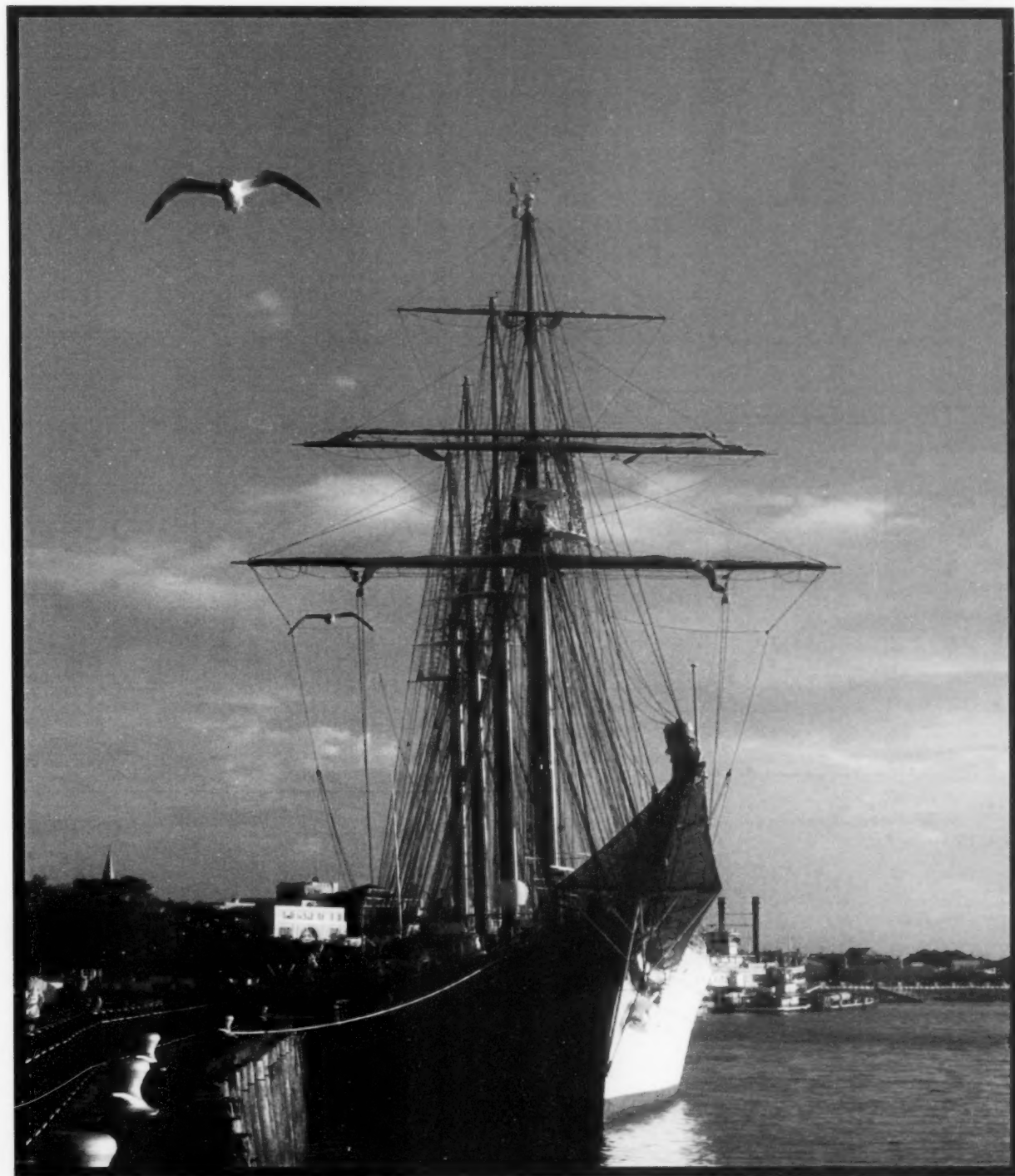




# Mariners Weather Log

Vol. 48, No. 2

August 2004



Spanish Navy Training Ship *Juan Sebastian de Elcano* Visits Port of New Orleans, Louisiana

*Image courtesy of Paula Campbell, PMO, New Orleans, Louisiana*



## Mariners Weather Log

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**W**elcome aboard! I want to thank you once again for taking the time to read our latest issue of the Mariners Weather Log (MWL.) I hope the lazy, hazy, crazy days of summer are treating y'all well. As we chatted about last time, the VOS program has had a bit of a personnel shakeup. Ms. Paula Campbell is now fully on line and working her little docksiders off in the port of New Orleans and the entire Mississippi Gulf Coast. Mr. Robert Drummond, the PMO in Miami finally had enough of government service and retired after 29 years. Bob says he wants to stay in South Florida, surf all day & sell coconuts to the tourists—Good luck Bob & hope the waves break in your favor. So now, we have another opening in the PMO ranks—or do we? The Miami office was quick in filling the very active billet so I am pleased to announce that Ms. Peggy Alander is our newest PMO. Peggy transfers in from the salty shores (?) of Goodland, Kansas, but is very well qualified. Peggy is a retired Navy meteorologist that has been searching for her own "Snug Harbor." Let us welcome her aboard and wish her the best. The VOS Technical Lead position brought a very large listing of extremely qualified people. This listing was paired down to three so now we are anxiously awaiting the final decision by our Director.

Ok, now back to this issue. It was an exhaustive search, but I think I found some interesting stories for you this time. We cover the gambit from drifting buoys off South Africa, Alaskan lighthouses, and even an "Iceberg Wrangler."

So now, just find a shady spot, grab a nice cold glass of lemonade and enjoy the MWL.

Regards—Luke ⚓

### Some Important Web Page Addresses

NOAA	<a href="http://www.noaa.gov">http://www.noaa.gov</a>
National Weather Service	<a href="http://www.nws.noaa.gov">http://www.nws.noaa.gov</a>
National Data Buoy Center	<a href="http://www.ndbc.noaa.gov">http://www.ndbc.noaa.gov</a>
AMVER Program	<a href="http://www.amver.com">http://www.amver.com</a>
VOS Program	<a href="http://www.vos.noaa.gov">http://www.vos.noaa.gov</a>
SEAS Program	<a href="http://seas.nos.noaa.gov/seas/">http://seas.nos.noaa.gov/seas/</a>
Mariners Weather Log	<a href="http://www.vos.noaa.gov/mwl.shtml">http://www.vos.noaa.gov/mwl.shtml</a>
Marine Dissemination	<a href="http://www.nws.noaa.gov/om/marine/home.htm">http://www.nws.noaa.gov/om/marine/home.htm</a>
U.S. Coast Guard	<a href="http://www.navcen.uscg.gov/">http://www.navcen.uscg.gov/</a>
Navigation Center	<a href="http://www.marcomms/">marcomms/</a>

See these Web pages for further links.



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## Good Buoy!—The First of the 'Winter' Wave Events.

*Ian T Hunter, Manager: Maritime Services, South African Weather Service*

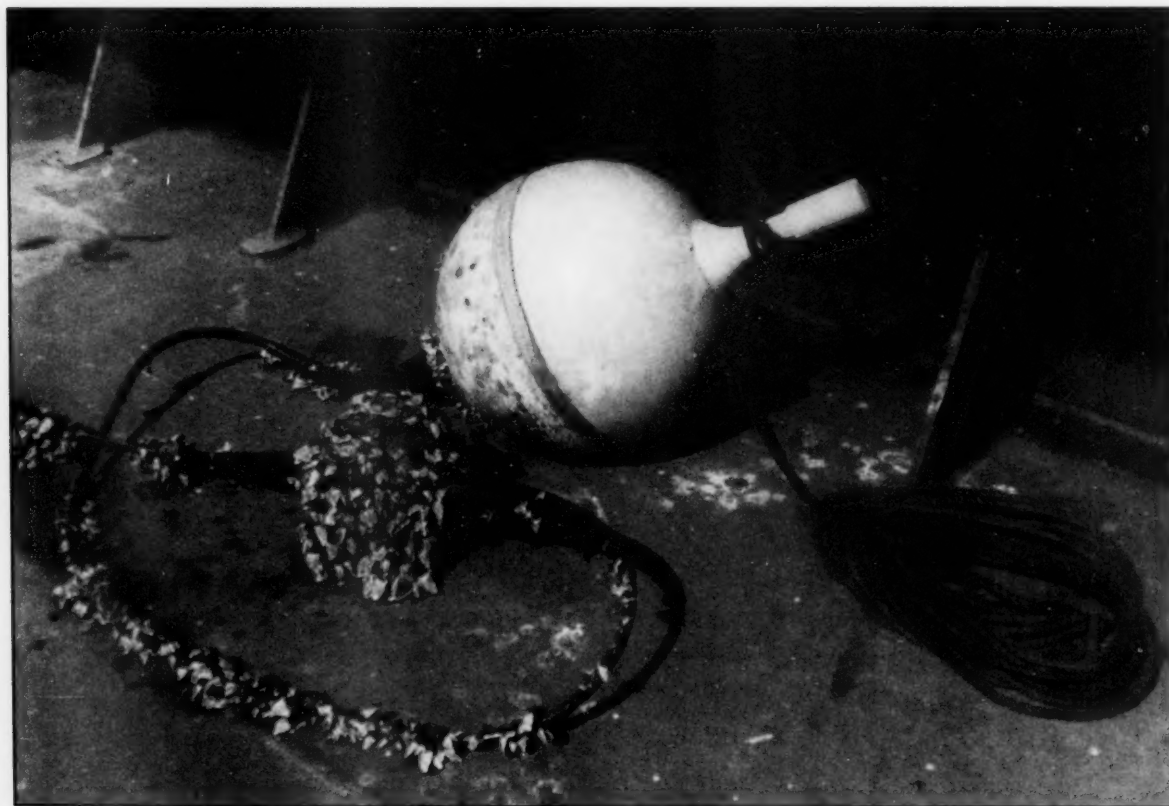
**D**uring 2003 the South African Department of Environmental Affairs and Tourism's vessel, the **SA Agulhas**, deployed 43 drifting weather buoys. Of this total, 24 belonged to the South African Weather Service (SAWS).

How do you get them back? This is a common question put to SAWS personnel when people see a photo of one of the drifting weather buoys (as shown below). When told that all this equipment (sensors, satellite transmit-

ter, battery pack etc.) is simply thrown into the sea and left to drift with the ocean currents, the usual response is one of shock. 'What a waste of money!'

This is by no means the case. Were it not for the 'drifter' network the Southern Ocean would remain a data desert. The intensity of deep mid-latitude cyclones would be seriously underestimated at times. And wave predictions would be a lot less accurate.

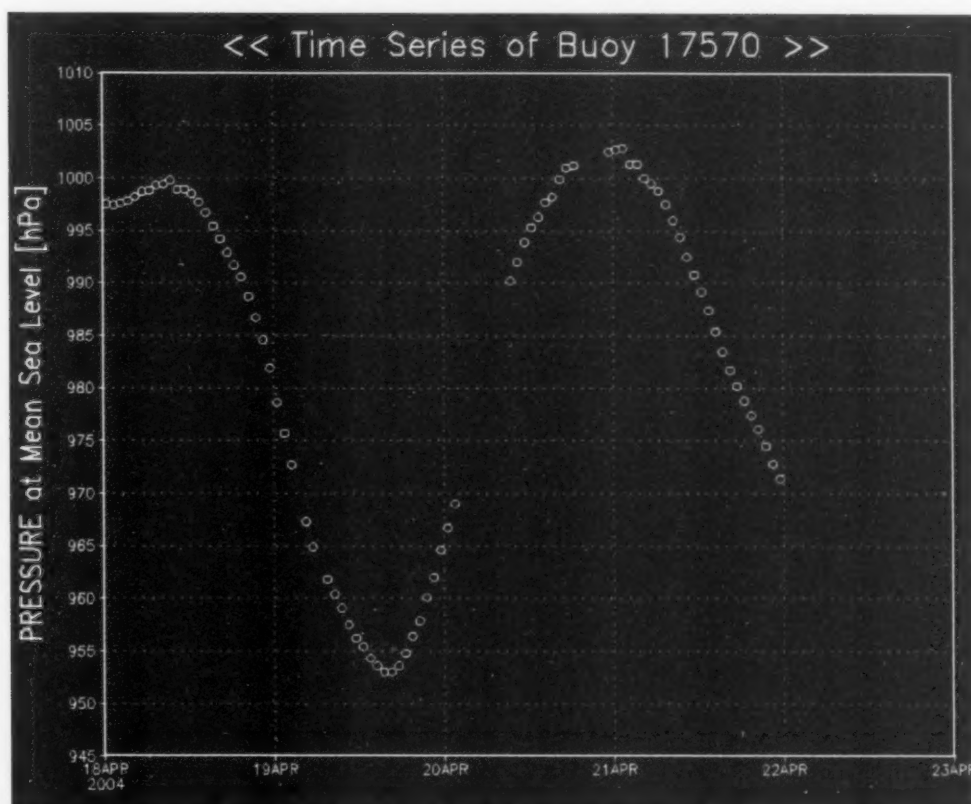
On Thursday morning 22 April a huge, 6m south-westerly swell started to push eastwards across the Agulhas Bank—the first really heavy swell of the winter season. SAWS has access to the output of two global wave prediction models: one run by the Meteorological Office in the United Kingdom and the other the NOAA WAVEWATCH III model run in the United States. Both models were predicting these conditions, to within a few hours and a half-metre in wave height—5 days ahead of the event!



**One that did not get away.**

**A recovered SVP-B buoy on board the SA Agulhas.**

*Photo: JR vd Merwe*



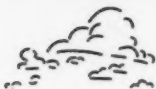
Barometric pressure trace from buoy 17570. The minimum pressure of 953 hPa indicates the passage of the rapidly-intensifying low pressure system. Three days later the resultant Southwesterly swell reached the South African coast.

Quite apart from its effect on all types of vessels transiting the Bank, this type of wave condition may have a very disruptive effect on the offshore oil and gas industry located in these waters. And once this swell moves into the fast flowing—and opposing Agulhas Current, there is always the potential for abnormally high, episodic waves to occur. These are the so-called ‘freak’ waves which have been known to break a vessel in two off our east coast.

So how is it that these wave models are so smart? Very good physics no doubt. But they also need input data. Buoy 17570 was deployed from the **SA Agulhas** on 19 January 2004. The ship was then mid-way between Bouvet Island and the South Sandwich Islands, making her way back to the ice shelf after a special buoy deployment cruise. The barometric pressure readings from buoys such as this one helped the atmospheric models to accurately analyse

and predict the winds at those high latitudes. These winds were then fed into the wave prediction models.

Thank you to all those ‘ships of opportunity’ that have helped to spread these buoys around the global oceans. ↓



## Iceberg Wrangler

### When a Million-Ton Iceberg Threatens Your \$5 Billion Oil Platform, Who You Gonna Call? Jerome Baker

By Michael Ryan

Originally appeared in *SMITHSONIAN*, February 2003

**T**here are just a handful of people in the world who do what Jerome Baker does—venture out far into the North Atlantic, tie a rope around a rogue iceberg heading toward an offshore oil platform, maneuver a 9,600-horsepower, 270-foot-long boat and drag the 250,000-ton ice cube away before it collides with the platform. If Baker makes a mistake, it might cost him his life and those of his crew.

Baker, 48, is the master of the **Norseman**, a 6-year-old, 4,600-ton ship with a steel-reinforced hull that services the Hibernia oil platform. The platform, which lies almost 200 miles off St. John's, Newfoundland, drills for crude oil in 250 feet of water and supplies Exxon, Mobil and four other oil companies. Baker and his crew of 10 to 14 men spend most of their monthlong tours of duty steaming between St. John's and the platform, delivering food and water, pipes and equipment, cargo containers and fuel. (Baker heads home to his wife, Maxine, and three children in Marystown, Newfoundland, for four weeks after each stint at sea.) From February through July, his most

important responsibility is watching for the hundreds of icebergs that float down the Labrador Current from Baffin Bay each year as the weather warms. Often as long as two football fields and rising as much as 240 feet above the sea, these bergs drift along a corridor known as iceberg alley, off the eastern coast of Newfoundland.

Although the Hibernia platform is stationary and boasts a massive concrete structure designed to withstand being run into by a million-ton iceberg, Baker says the company doesn't "want anything coming into contact with the platform, even something the size of a piano."

Following the sinking of the **RMS Titanic** in 1912 after it hit a half million ton berg 400 miles south of Newfoundland, a consortium of North American and European nations established the International Ice Patrol (IIP) to prevent such tragedies. Today, the IIP, which operates out of Groton, Connecticut, sends U.S. Coast Guard C-130 aircraft on patrols over the North Atlantic and supplies information to the maritime community about iceberg-free lanes of travel. A private Canadian company, Provincial

Airlines, which is hired by Hibernia and the owner of another oil-drilling company, uses this data to direct a small fleet of two-engine Beech King Air 200s. Observers in these light planes scan for potentially troublesome icebergs. They, and radar operators aboard

the oil rigs and platforms, must constantly monitor the bergs; the storm-lashed seas of the North Atlantic often throw them off their projected paths. Just last year, the shrimp trawler **BCM Atlantic** struck an iceberg and sank within five minutes.

Provincial Airlines keeps a lookout not only for fullfledged icebergs but also for "bergy bits," pieces of ice that have broken off. (Despite their snack-food name, bergy bits can be larger than houses and as dangerous as torpedoes.) When the drift pattern of a berg or a bergy bit appears to intersect with the Hibernia platform, the **Norseman** or its sister craft, the **Nascopie**, gets a call on the radio.

"For a smaller bit," Baker says, "I back up to it and use prop wash" to push it into a current that will take it away from the platform. Big bergs are something else again. "We get close to them—maybe 100 feet," he says. "The berg is like a piece of glass, full of cracks. Something could break and come off at any time. In the nighttime, you might have projections



"Danger is part of the job," says Jerome Baker (above, in St. John's harbor, Newfoundland), who tows away icebergs (like the two-million-ton monster, next page) before they collide with oil rigs.

Photo Courtesy Russell Monk



# Iceberg Wrangler

When a million-ton iceberg threatens your \$4 billion oil platform, who you gonna call for help? Baker

BY MICHAEL W.



Image courtesy of C-Core, Danny Christian, and David Gullage

sticking out of the side of the berg that you can't see. All these things are in your mind."

To round up an iceberg, Baker uses lengths of polypropylene towropes up to 1,200 feet long. "When the rope goes out, it's eight inches thick. It's only an inch thick in places when it comes back," he says. "The rope looks like a camel's been chewing on it."

Wrangling an iceberg sounds simple enough: just pay out a length of rope; if you need more, shackle another to it, then another, until the iceberg has been completely encircled. "You just

steam around the berg and come back," Baker says. "A seaman with a grapple catches the other end." Then, add a wire towline (to weigh down the rope in the water so that it does not slip off the ice), steam away, and with any luck you're home free. But it's not so easy in practice.

Icebergs have a nasty tendency to turn over and slip out of towropes; some have hidden undersea projections that cause chaos when the bergs flip. (A towrope from an over-

turned berg may sport a tangled knot six feet high.) And a flipping berg can generate large waves. Which is why Baker likes to keep a half mile or so of open water between the **Norseman** and any berg he's towing. And talk about slow motion.

"We can spend up to three days towing a big berg," Baker says. Pulling a 250,000-ton berg, the **Norseman** can barely manage one knot (and the ship may need ten hours to build up to even that speed).

Baker, one of 13 children born to a shipyard worker and a housewife, grew up in Marystown and quit



The world's largest lasso? "The major problem is keeping the rope on the iceberg," deadpans Baker, who employs a 3,600-foot-long, eight-inch-thick rope to wrangle unruly icebergs (such as the relatively modest 70,000-tonner, above).

Image courtesy of Hibernia Management & Development Co.

## Iceberg Wrangler



Memorial University after a year to enter the nautical training program at the Marine Institute in St. John's. "I couldn't see spending my life at a desk," he says. He rose from deck-hand to captain by the age of 30, and first handled an iceberg in 1983. The job, he says, hasn't grown any easier.

Not that people haven't tried to make it so. In his 20 years of iceberg work, Baker has seen and heard about many innovative berg-taming techniques. There was the time in the 1960s when the U.S. Coast Guard spread carbon black on several bergs in the belief that the substance would absorb warmth from the sun and melt the ice. Mostly, however, the blackened bergs just flipped over.

In 1985, Baker tried using a powerful water cannon, which worked fine for small bergs but not for large ones. In another experiment, a boat crew tested a remote-controlled vehicle, which was designed to drill holes into an iceberg, insert towlines and then freeze them in place with liquid nitrogen. The rough seas made accurate drilling impossible.

Though Baker has never lost a man, there have been some close calls. Once, in the mid-1980s, the rope got stuck in one of the ship's two propellers—Baker didn't know which one. "I had to declutch and do an emergency shutdown of the two engines," he recalls. "We were being dragged very slowly toward the ice-

berg. There isn't a hull strong enough to withstand its being scraped against a berg; if there was, it wouldn't float."

About 300 feet from a collision, Baker took a chance, reversing the right propeller shaft. After a few frantic seconds, the rope began to untangle. "It felt pretty good to get out of that situation," he says.

Conditions in the North Atlantic can be too rough to work. "If the wind gets above 45 or 50 miles per hour, you just don't try; it's too dangerous," Baker says. Thanks to patrol reports and radar, he usually has several days' notice about any berg on a collision course with a platform. That usually means he'll have time to let a storm blow over and still get the job done.

But one day in the 1980s, a competent observer on a now-defunct floating rig somehow let an iceberg get to within five or six miles of the rig. Typically, bergs move at a clip of about one knot.

"There was a mad scramble," Baker says. "The weather was too rough to

tow the iceberg. Three of the deckhands on one boat and two on another were washed around the deck and got hurt." The only option left was to try to pull the rig's eight massive anchors up and move the rig out of danger. But one of the anchor chains on the rig got tangled; there was no question of breaking free. It was far too late to deploy helicopters or use rig-to-ship baskets to evacuate the crew on the rig.

"The guys on the rig were watching to see which way the berg was going," Baker says. "At the last minute, the supply boats managed to pull the rig 100 meters sideways. The berg came straight over the wellhead where the rig had just been. That was the closest call." In times like those, says Baker, "your heart rate starts going up and you hit maximum blood pressure. There are so many things that can go wrong."

Still, with a son, Chris, at Memorial University in St. John's studying engineering, a daughter, Amanda, heading off to college next year, and an 11-year-old son, Andrew, at home, Captain Baker has no plans to hang up his foul-weather gear anytime soon. The pay is good, about \$100,000 a year. As for that incomparable feeling he gets when he spies an iceberg on radar?

"It's no big deal," he says. "It's all part of the job." ↓



**Though protected under water by a belt of giant concrete teeth, oil platforms remain vulnerable to errant bergs.**

*Image courtesy of Hibernia Management & Development Co.*



## Twenty-two Lives Saved By AMVER Ships!

*Compiled from actual accounts forwarded by the Masters of the vessels summarizing two AMVER Rescues*

**R**ecently, merchant ships participating in the U.S. Coast Guard's AMVER Search and Rescue System safely recovered twenty-two survivors in two separate incidents at sea. The types of rescues demonstrate the wide range of emergency situations which can be encountered by Amver ships, which participate in the program voluntarily.

The first case involved the 684-foot product tanker **M/T Inca**, owned by Tsakos Energy Navigation Ltd. of Athens, Greece. While underway off the coast of Colombia, enroute to Cristobal, Panama, a crewmember sighted a 7-meter capsized fishing boat with 4 persons on it and notified the officer on watch. **Inca's** Master, CAPT Kontomihis, who was on the bridge, changed his ship's course to assist and recovered three of the four, who had to be treated for shock.

Unfortunately, they advised that the fourth crewman was already deceased and had been tied off to the boat. The tanker's crew attempted to recover the body and take it aboard, but to no avail. **M/T Inca** was on charter to ChevronTexaco, and Company Official Ian Meadows advised Amver that the ship's crew had "gone the extra mile" in this rescue, with both the Chief Mate and Bosun jumping into the very rough seas, with a high easterly swell, to assist with the res-

cue and recovery effort. Within a few hours, the capsized boat was lost under the waves.

Upon the arrival of a Colombian Coast Guard vessel, an attempt was made to transfer the survivors, but was aborted due to the wind force 6/7 Beaufort. The survivors were delivered in good condition to Panamanian authorities in Cristobal and transported to the Colombian Embassy for repatriation, as **Inca** began its transit of the canal to its next port of call in San Francisco.



Only two weeks later, on the other side of the world in the Arabian Sea, the Singapore-flagged container ship **APL Pusan** collided head-on with the Panamanian product tanker **Delta 1** in heavy fog. The tanker caught fire, broke in two and sank. The **APL Pusan** was enroute to the port of Mundra from the Dubai port of Jebel Ali. The collision occurred off the western coast of India and, although

the tanker was carrying diesel fuel, lube, gear and heavy oil, the Indian government expected no resulting environmental damage.

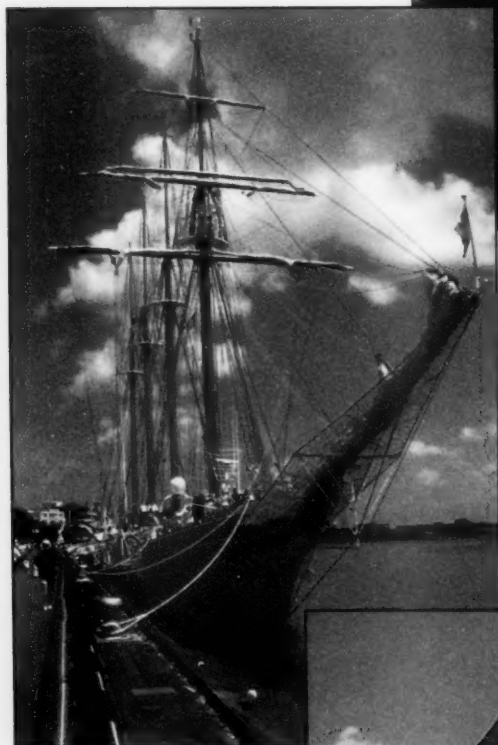
The **Delta 1** sent out a distress signal and its crew of (19) abandoned ship. The **M/V Kota Teguh**, a container ship also of Singapore registry, copied the Mayday call on VHF Channel 16. CAPT Peter Brakocevic turned his ship and proceeded to the position of the collision, 6 nmi away. Guided from the bridge, his crew lowered the rescue boat and made their way toward the survivors. Within two hours 18 crewmembers were embarked in **Kota Teguh**.

There was zero visibility, a strong current, and the tanker was on fire during the rescue operation, which brought **Kota Teguh** within 0.7 nmi of **M/T Delta 1**. The crew were all in good condition except for the second mate, who suffered a fractured collar bone and a deep gash wound in his right leg. The **APL Pusan** came about to recover the one remaining crewmember from the tanker for a full accounting of the crew of 19. In this case, the merchant ship even took the extraordinary initiative to assume the duties of on-scene rescue coordinator. J.



## Spanish Navy Training Ship *Juan Sebastian de Elcano* Visits Port of New Orleans, Louisiana

*Images courtesy of Paula Campbell, PMO, New Orleans, Louisiana  
and Donn Young, Port of New Orleans*



The **Juan Sebastian de Elcano** is a full 4 masted top-sail schooner with square-rigged foremast. It was launched March 5th, 1927 and delivered to the Spanish Navy on August 17, 1928. It was built with an iron hull and rigging consisting of 20 sails and is currently used by the Spanish Navy as a sail-training vessel.

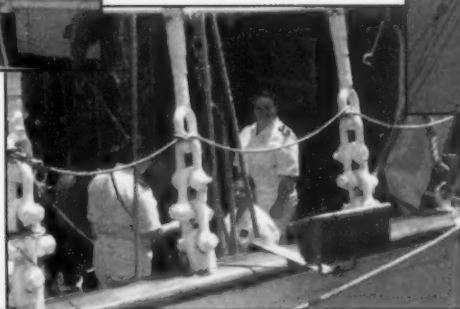
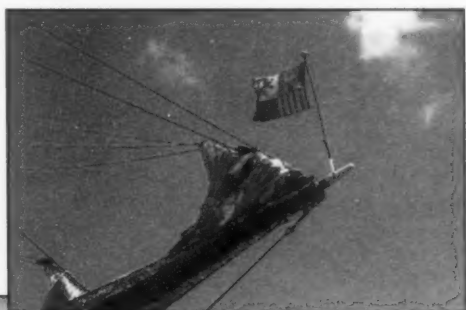




## Spanish Navy Training Ship



Ferdinand Magellan is usually credited with being the first man to circumnavigate the globe, but he was killed in the Moluccas in 1521 when his ship **Victoria** was only about halfway around the world. The pilot Juan Sebastian de Elcano took command of the vessel and arrived back in Spain with a crew of only nineteen men after a voyage of three years. Therefore, **Juan Sebastian de Elcano** is a fitting name for a Spanish sail-training vessel, and his four-masted namesake has served the officers and cadets of the Spanish Navy in that capacity for almost three-quarters of a century. **Juan Sebastian de Elcano** has served as both a training vessel and goodwill ambassador for Spain.





## Five Finger Lighthouse Alaska

*Information and historical picture reprinted with permission of Juneau Lighthouse Association*



Five finger Light Station is one of the two oldest light stations established in Alaska. Increased shipping in Alaska's Inside Passage, due to the discovery of gold in the Yukon just five years before, caused the Federal Government to appropriate a little over \$425,000 to establish the territory's first six light stations. Lit for the first time on March 1, 1902, the lighthouse on Five Finger Island was constructed to guide vessels into the bustling frontier town of Juneau. The original structure (seen below) was burned to the ground on December 8th, 1933. The station keepers were able to save the boathouse and the carpenter's shop, but the tower, dwelling and the radio-beacon were destroyed. A Public Works appropriation of \$92,000, made under the Roosevelt administration during the "Great Depression", enabled Five Finger Light Station to be rebuilt to its current concrete structure.

Five Finger Light Station is currently operated as a National Oceanic and Atmospheric Administration, Coastal Marine Automated Network (C-MAN) Station.

C-MAN was established by National Data Buoy Center (NDBC) for the National Weather Service (NWS) in the early 1980's. The development of C-MAN was in response to a need to maintain meteorological observations in U. S. coastal areas. Such observations, which had been made previously by USCG personnel, would have been lost as many USCG navigational aids were automated under the Lighthouse Automation and Modernization Program (LAMPS). In all, approximately 60 stations make up C-MAN.

C-MAN stations have been installed on lighthouses, at capes and beaches, on near shore islands, and on offshore platforms.



A renovation project is currently in progress which will eventually enable the lighthouse to be open to the public and overnight guests.

Visit the website: <http://www.5fingerlighthouse.com/>

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C-MAN station data typically include barometric pressure, wind direction, speed and gust, and air temperature; however, some C-MAN stations are designed to also measure sea water temperature, water level, waves, relative humidity, precipitation, and visibility. These data are processed and transmitted hourly to users in a manner almost identical to moored buoy data. In addition to the conventional method of data transmission, certain C-MAN stations are equipped with telephone modems that allow more frequent data acquisition, data quality checking, and remote payload reconfiguration or restarting. ⚡



## Shipwreck: *Ridgefield*

By Skip Gillham, Vineland, Ontario, Canada

**T**he **Ridgefield** was one of approximately 2,700 Liberty ships that were built in the United States during World War Two. These vessels were a standard design and construction and provided outstanding service all over the world. They delivered war supplies to the troops and then helped rebuild countries devastated by years of fighting.

The Liberty ships shared dimensions of 441 feet, 6 inches, in length and had the ability to carry 10,000 tons of cargo. They were steam powered and each had a 2,500 horsepower triple expansion engine.

What became the **Ridgefield** was built by the New England Shipbuilding Corporation of Portland, Maine. It was completed in February 1945, as **James A. Butts** and was initially managed for the United States Maritime Commission by the Calmar Steamship Corp. Beginning in 1946 States Marine Corp. took over management and, a year later, they purchased the ship.

The name was changed to **Lonestar State** in 1947, **Lone Star State** in 1951, **Anniston** in 1955 for the Ace Steamship Corporation and **Caldwell** for Caldwell Transportation in 1957.

After twelve years under American registry, the vessel was sold to the Ridgefield Navigation Company Limited later in 1957 and registered in Liberia as **Ridgefield**. The ship worked as a tramp steamer and saw service on a variety of saltwater routes.

Prior to 1959 freighters larger than 261 feet in overall length could not enter the Great Lakes via the St. Lawrence due to the small locks between Montreal and Lake Ontario. This was changed with the construction of the St. Lawrence Seaway and over 200 different Liberty ships, including the **Ridgefield**, came inland to ports such

as Duluth, Thunder Bay, Chicago, Detroit, Cleveland and Toronto exchanging cargoes to and from world ports.

**Ridgefield** had three trips to the Great Lakes in 1961 and another in 1962 before being lost later in the year. The vessel is shown upbound in Lock 4 of the Welland Canal in a photo from the collection of Shipsearch Marine.

Late on December 18, 1962, **Ridgefield** was traveling in ballast from Maracaibo, Venezuela, for a U.S. Gulf Coast port when it stranded off the east end of Grand Cayman Island. The ship was lodged securely on the rocks and salvage efforts were fruitless. Before long the hull broke in two.

The crew abandoned the **Ridgefield** and the ship was left to the relentless action of the sea. Waves pounded the hull and it was slowly broken apart. Sections of the old Liberty were still visible in 1981 and likely many years later. ↓





## Sail Training at Maine Maritime Academy

By Captain G. Andy Chase, Professor of Marine Transportation, Maine Maritime Academy

In this modern age, all maritime schools are spending a great deal of money and time buying and training our students to operate the latest technologies in ship operations and management. Why then would Maine Maritime Academy want to also train them to sail an eighty year old sailing ship?



Maine Maritime Academy's Schooner *Bowdoin* reaching across Penobscot Bay, Maine at over eleven knots on the Auxiliary Sail cruise in October 2002.

The answers are many, but first let it be said that we don't require all of our students to sail on our sail training vessel, the 1921 built, wooden, two-masted schooner *Bowdoin*. We require our Small Vessel Operations students (candidates for 200 ton or 500 ton licenses) to do so, and we encourage all others to do so.

The primary reason we encourage all students to take advantage of this training is that we consider it the finest basic training there is for a career at sea. It is training with consequences.

How many mates, standing watch in the enclosed, air conditioned bridge of

a container ship or tanker, do you think would be able to answer the question "What direction and strength is the wind at this moment?" without having to look, either out the wheel-house windows, or worse, at the anemometer? It would be a rare mate on a sailing ship who couldn't tell you immediately, without even glancing at

the compass. Most of them could tell you even when they are off watch. And most of them will notice, even when down below having dinner, if the wind shifts by more than a point.

Why?

Because such

information has consequences on board a sailing ship. It has consequences on board a container ship or a tanker as well, but too many mates are too far removed from their environment to notice such things.

A training program on board a sailing ship requires no contrived input from the "trainers" since the environment provides the curriculum. If you simply require the trainees to plan and execute the voyage they will get plenty of training. That is what makes it such a powerful training tool. There need be no lecture on the effects of a wind shift on your planned route. It will be obvious when it occurs, and it will demand a solution immediately. There

will be no grade to debate. You will either arrive on time, and without damage, or you will not. It will be quite clear if you have passed the final exam.

The consequence of each and every decision is obvious...sometimes painfully so. A delayed decision about reefing might be made out of laziness, inattention to the changing conditions, or simply out of decision-making paralysis. Regardless of the reason, such a delay may easily require all hands to be called in the middle of the night to tie in a reef (shorten sail) in the midst of a squall, increasing the risk to all. All hands will know who didn't pass that test of seamanship. There are consequences to even the smallest things. A furled sail incorrectly secured to the spar will find its way out of its lashing in a squall, perhaps causing the loss of the sail. The consequences of that mistake are more than financial. Shipmates on some vessels will have to be put at risk to climb aloft to secure the damaged sail before more harm is done. Then the vessel will have to proceed at reduced speed until a sail repair lesson is completed.

Every aspect of seamanship is revealed in its purest and most demanding form. Some examples:

**Meteorology:** You must understand the minutest details of meteorology if you are to take advantage of every slant of wind between departure and arrival. To miss the signs of an approaching storm or squall can have severe consequences.

**Marlinspike Seamanship:** You will use knots and splices, bends and beck-



ets, deadeyes and lanyards, wire and rope, canvass stitches and patches, and rigging techniques that though old, are still important today. For what is modern cargo gear but a refinement of the old sailing ship rig? It may be nearly unrecognizable now, but the basic principles are exactly the same, and an understanding of the basics will help the mate understand the most modern equipment.

**Stability:** A sailing ship is a stability-model in motion. You see and feel every force. You are engaged in a perpetual inclining experiment. You must constantly monitor the forces of the sails and the seas so as to stay within the safe limits of your dynamic stability curves. While a sailing ship's generous stability may be forgiving, the crew may not be when you cause them to be thrown from their bunks by misreading the approaching wave, or failing to slack a sheet.

**Shiphandling:** As master of a modern containership, car carrier, or LNG ship you will be carrying more sail area than the largest sailing ship ever built. If you don't understand the effects of wind on a sail you will forever be at a disadvantage when handling your vessel. If, however, you have learned to handle a sailing vessel you will find it intuitive to use the wind as an assisting force whenever possible. Even when not under sail, a sailing ship is a strict teacher of shiphandling, for such vessels are typically under-powered, carry a large amount of windage, and have very delicate projections at each end (bowsprits and boomkins and such).

**Cargo Stowage:** Given the amount of heel that sailing vessels typically carry when under sail, cargo stowage is arguably more demanding than on any other type of vessel. Imagine being told to stow your cargo for a

voyage that will be conducted with an anticipated list of ten degrees, which will alternate every few days from port to starboard. And expect to roll deeply on a regular basis. Your cargo lashings and shoring will be severely tested.

**Navigation:** Gone is the notion of laying down a trackline in advance and following it for days or weeks on end. Under sail there is no such thing as a rhumb line or a great circle track from departure to destination. Every day is spent going in every direction but the one you desire, hoping to make good, on average, a track approximately toward your destination. Your navigation is constantly challenged as you carry each tack as close to danger as circumstances and good seamanship permit, in order to take advantage of a good slant of wind.

Merchant Navies of many countries have long recognized the value of a traditional sailing vessel to train men and women to sail on power driven merchant ships. Some of our students will benefit by this training for a merchant marine career. But with all the traditional sailing ships operating in the world today, we are in fact training many of our students to be the mates and masters aboard these sailing vessels. The American Sail Training Association ([www.sailtraining.org](http://www.sailtraining.org)) lists over 250 such vessels in

their directory, and all of them need qualified and certified mates and masters. Maine Maritime Academy is the only school in the US where a student can get a college degree, a license, and all the necessary certificates to sail in these positions. We have a number of faculty and staff with extensive experience in this field, and as a result we have assembled a concentration in Sail Training. This curriculum includes courses dealing with topics such as rigging, sail handling, sailing vessel casualty analysis, and



Auxiliary Sail class practicing sail handling with Maine Maritime Academy's second, smaller schooner *Puritan*, fall 2002.

sailing vessel stability.

In August of 2003 we determined by poll that forty percent of our incoming mate candidates considered sail training to be a "major" factor in their choice of MMA over other maritime colleges. It is a niche market, and we are proud to be in the lead position in this unique field, especially since it compliments our core mission so well.

Details about MMA's Sail Training Curriculum can be found at:  
[http://bell.mma.edu/~achase/Aux\\_Sail\\_Curriculum.html](http://bell.mma.edu/~achase/Aux_Sail_Curriculum.html)





## Marine Weather Review—North Atlantic Area January to April 2004

By George P. Bancroft, National Center for Environmental Prediction

### Introduction

An active winter pattern dominated much of the period into early March, during which all of the hurricane-force storms occurred. Many of the lows during this period tracked northeast off the mid-Atlantic and northeast coast of the U.S. or the Canadian Maritimes and passed near or over the island of Newfoundland before passing between the British Isles and Greenland. A few turned back to the northwest toward Labrador under the influence of blocking to the north. The most significant events were hurricane-force storms developing off the coast in the western North Atlantic, including those in the middle of the months of January and February, and also in early March. Relatively little cyclonic activity extended across the British Isles into the North Sea or east into mainland Europe, due to persistent high pressure. There were no tropical cyclones during the four-month period.

### Significant Events of the Period

**North Atlantic Storms, January 1–12:** A slow-moving area of low pressure deepened over the southern

Labrador Sea on January 1 while initially drifting north. The central pressure dropped to 968 hPa at 0600 UTC January 2, when Ocean Prediction Center (OPC) briefly analyzed the system as a hurricane-force low near 55N 51W, with the strongest winds near the south Labrador coast. The low then drifted northeast away from the coast, weakening to a gale near Cape Farewell early on the 3rd, and then passing northwest of Iceland on the 5th. A second low passed east and then northeast off the south Labrador coast late on January 4 and gradually intensified into a 955 hPa storm near 60N 32W at 0600 UTC January 8, where it stalled. There were two ship reports with 60 kt winds, one a west wind from **Atlantic Cartier** (SCKB) (53N 34W) at 0600 UTC on the 8th, and the other a north wind from the **Sarpik Ittuk** (OWME) near 59N 42W at 1200 UTC on the 9th. The system subsequently drifted east and weakened to a gale south of Iceland on January 11. A third storm formed from the merger of two lows over the central North Atlantic on January 11, to develop a 973 hPa central pressure near 53N 17W at 1800 UTC on the 12th. OPC briefly analyzed a compact hurricane-force low at 1200 and 1800

UTC January 12. The system then weakened to a gale before passing over the British Isles on the 13th.

**Western North Atlantic Storm, January 15–21:** This low explosively deepened while moving off the mid-Atlantic coast of the U.S. early on January 15, becoming a storm 350 nmi north of Bermuda at 1800 UTC January 15. The center reached the south coast of the island of Newfoundland at 1200 UTC on the 16th, with the central pressure bottoming out at 948 hPa (27.99 in).

**Figure 1** shows the development of this hurricane-force low over a twenty-four hour period. The central pressure dropped 49 hPa in 24 hours, or about 2 hPa per hour. This storm was the most intense in terms of central pressure, and was the most rapid deepener, of the four-month period in not only the North Atlantic, but also the North Pacific as well. Some of the more notable ship and buoy reports are listed in **Table 1**.

Frigid arctic air followed in the wake of the storm, with Buoy 44005 (42.9N 68.9W) reporting a temperature of minus 18C early on the 16th. Even well offshore, Buoy 44011 (41.1N 66.6W) reported a temperature of

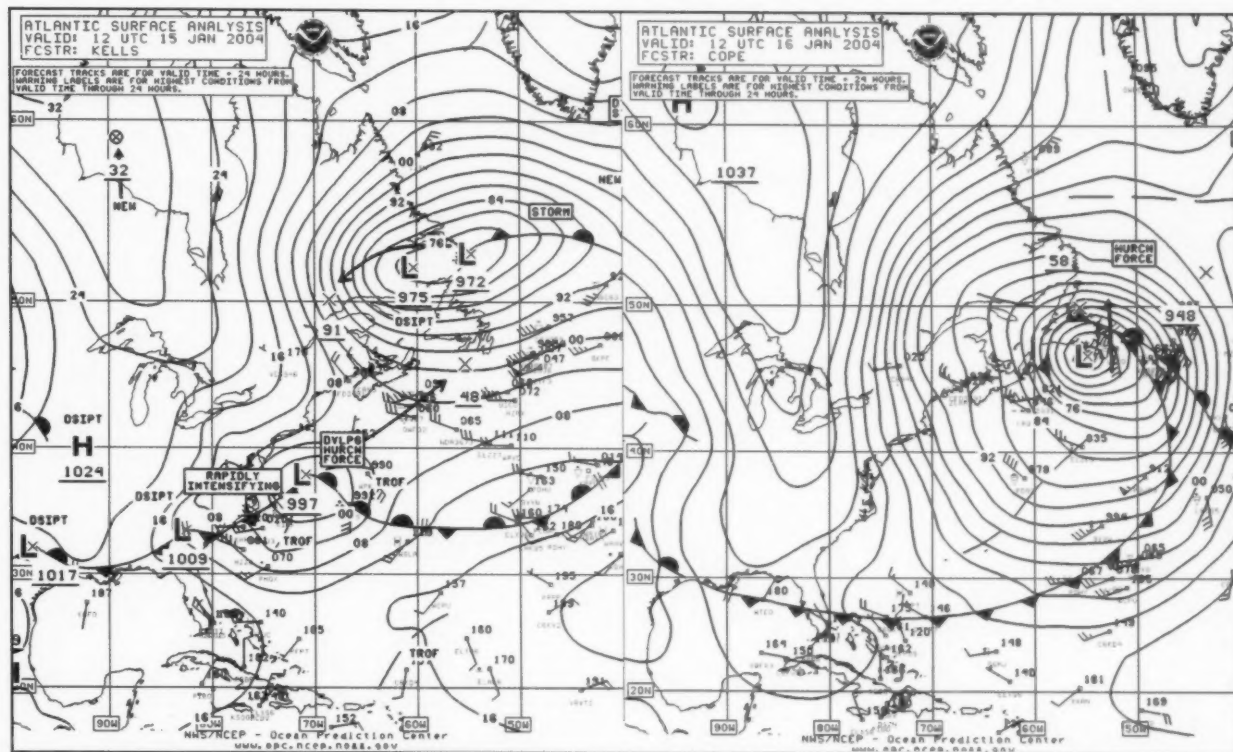


Figure 1. OPC North Atlantic Surface charts (Part 2—west) valid 1200 UTC January 15 and 16, 2004. The development of a hurricane-force storm (the most intense of the four-month period) is depicted.

OBSERVATION	POSITION	DATE/TIME(UTC)	WIND	SEAS(m/ft)
Hannover Express (DEHZ)	45N 56W	16/0600	NE 60	
VEP717 (oil platform)	46.7N 48.7W	16/1200	SE 65	
Lykes Motivator (WABU)	38N 55W	16/1800	W 60	
Norasia Tegesos (P3JA9)	38N 50W	17/0000	SW 60	
Buoy 44008	40.5N 69.4W	16/1000	NW 39	5.5/18
			Peak gust 54	
Buoy 44004	38.5N 70.5W	16/0500	NW 41 G52	6.0/20
		16/0900		7.5/25

Table 1. Some observations taken during the storm of January 15–21, 2004.

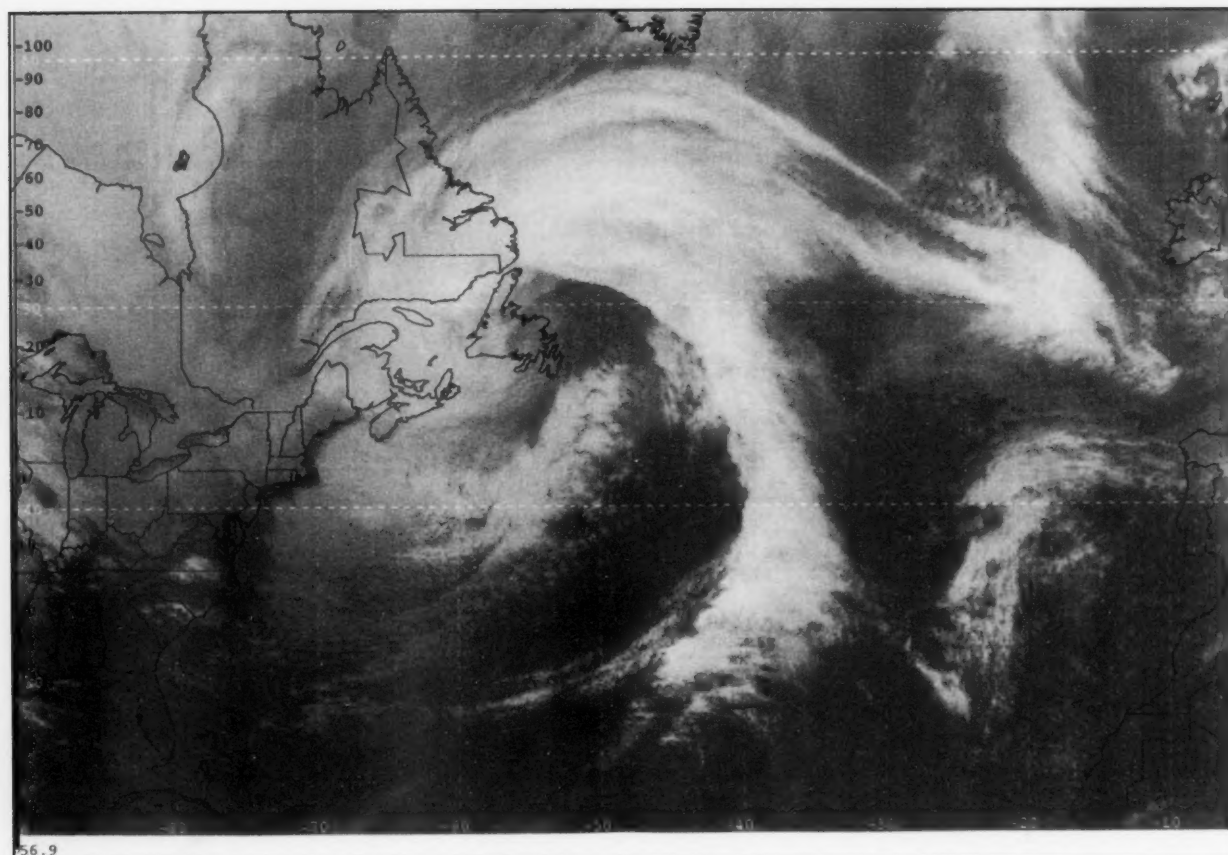
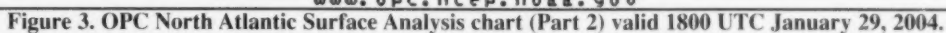


Figure 2. Mosaic image consisting of GOES12 and METEOSAT7 infrared satellite imagery valid 1800 UTC January 16, 2004, showing the storm in *Figure 1* near maximum intensity. The satellite senses temperature on a scale from warm (black) to cold (white) in this type of imagery

minus 10C at that time. **Figure 2** is an infrared satellite image taken as the storm was near maximum intensity, centered over the island of Newfoundland. Note the broad, well-developed frontal cloud bands with cold tops to the north and east of the center, and the cumulus-type clouds in the cold unstable air flowing off the coast south of the center. The system subsequently weakened and drifted east of Newfoundland on the 18th, with a secondary hurricane-force

storm center forming on the front near 55N 47W (970 hPa) at 1800 UTC January 17. The hurricane-force winds were north of the front, analogous to the situation in the late-January storm described below. This secondary center and the original low to the south then became a complex storm system in the central Atlantic on the 19th, and then moved north and weakened near Greenland by the 21st.

**North Atlantic Storm of January 25–29:** This storm followed a track similar to that of the previous system, but was not nearly as intense. After moving off the mid-Atlantic coast early on January 24, the low became a storm and stalled near Cape Race by 0000 UTC on the 26th, before drifting northwest on the 26th and forming a new center in the Labrador Sea late on January 28. **Figure 3** shows this secondary storm with a frontal system approaching Greenland at 1800 UTC



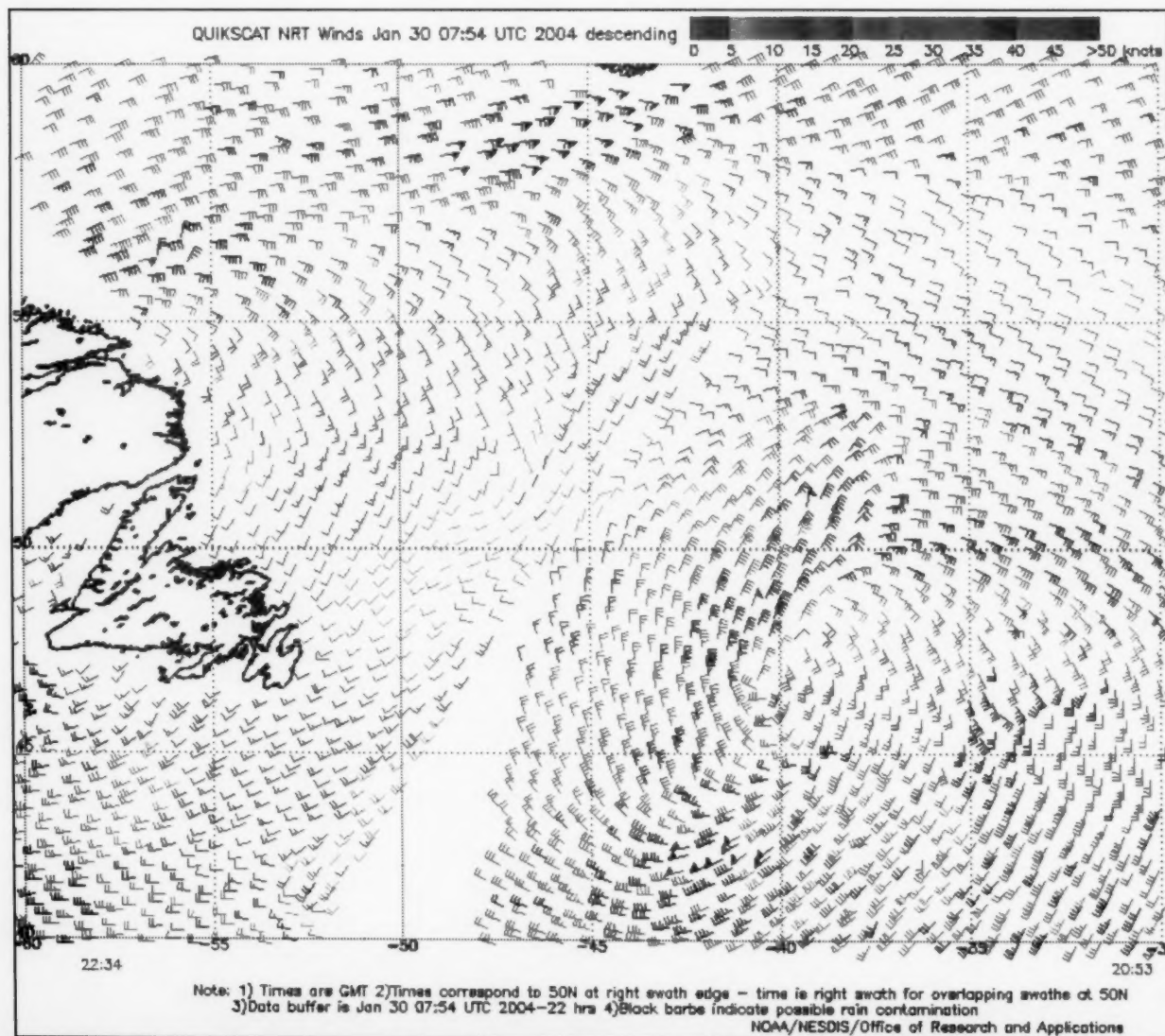


January 29. A QuikSCAT image with scatterometer winds (**Figure 4**) taken several hours later shows a wind maximum of up to 70 kt where winds are channeled between the front and the southern tip of Greenland (top of figure). Another storm circulation is seen to the south, passing well east of Newfoundland. The two centers then

moved inland over Labrador and weakened by the 30th.

**Western North Atlantic Storm of February 18–20:** This storm was perhaps the most noteworthy event of the period in terms of winds and seas generated. **Figure 5** shows the system fully developed at 1800 UTC

February 19, with the central pressure bottoming out at 960 hPa. Earlier, the low was already a storm six hours after moving off the North Carolina coast at 0600 UTC on the 18th. The central pressure dropped 38 hPa in the twenty-four hour period ending at 1200 UTC on the 19th. The superimposed satellite image in **Figure 5**



**Figure 4.** QuikSCAT scatterometer image of satellite-sensed winds valid at 2234 UTC January 29, 2004. The valid time of the pass is about four and one-half hours after the valid time of **Figure 3**.

Image is courtesy of NOAA/NESDIS/Office of Research and Applications.

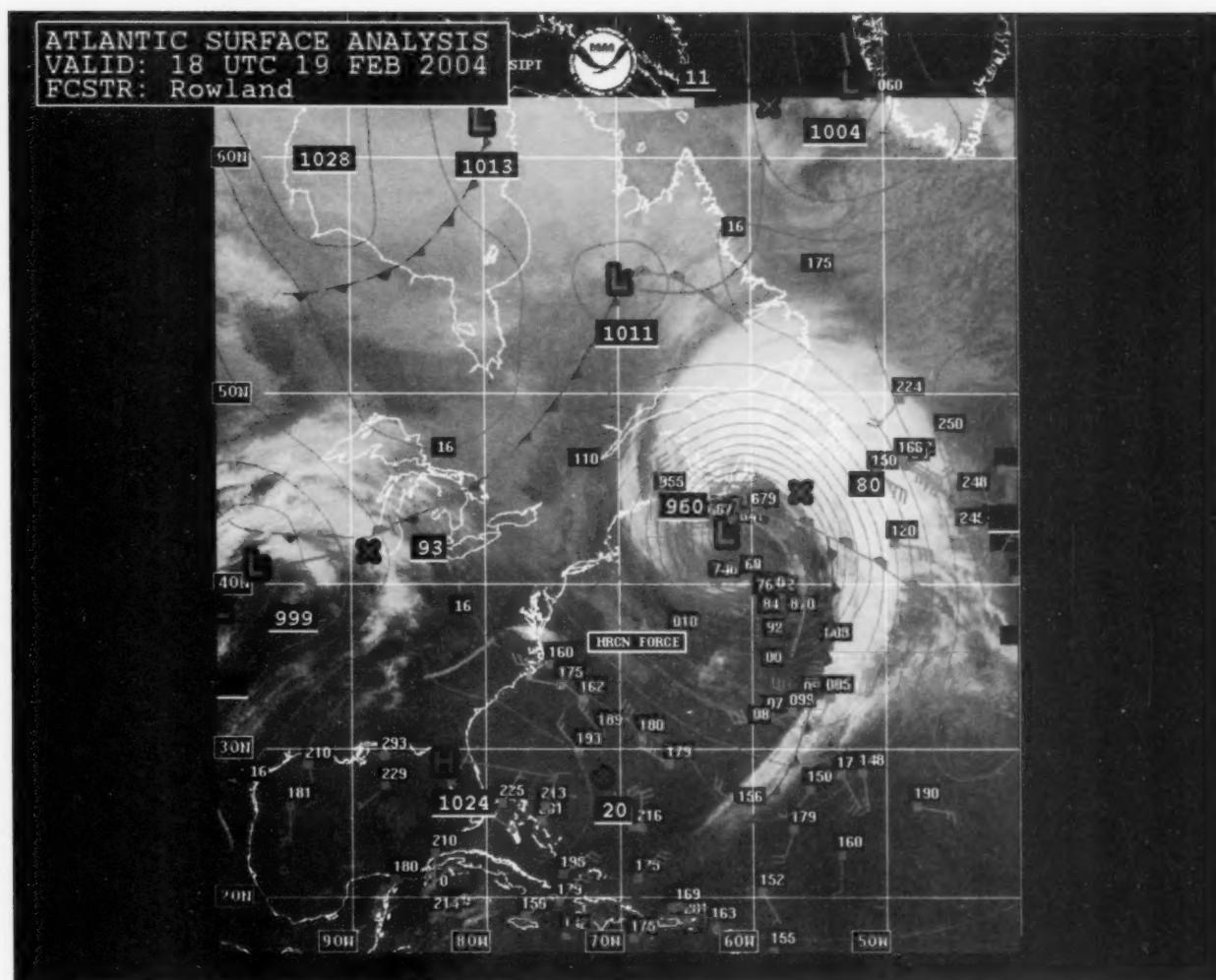


Figure 5. OPC Analysis chart (Part 2) valid at 1800 UTC February 19, 2004, superimposed on a GOES-East infrared satellite image valid at the same time. Satellite senses temperature on a gray scale ranging from black (warm) to white (cold) in this type of imagery



OBSERVATION	POSITION	DATE/TIME(UTC)	WIND(kt)	SEAS(m/ft)
Federal Progress (VRXL6)	36N 68W	19/0600	NW 65	
Zim Iberia (4XFP)	42N 66W	19/1200	N 75	8.0/26
Rowan Gorilla V (WCY5331)	44N 60W	19/1200	E 65	
Alouette Arrow (LALK4)	44.5N 62W	19/1200	E 60	13.5/45
SeaLand Pride (WDA3673)	40N 63W	19/1800	W 80	18.0/59
Alouette Arrow	43.5N 63W	19/1800	N 60	
Isomeria (GCGJ)	39.5N 59W	19/1800	SW 63	6.5/21
SeaLand Pride (WDA3673)	40N 61W	20/0000	W 50	16.0/53
Isomeria (GCGJ)	39N 59W	20/0000	SW 70	7.0/23
Alouette Arrow (LALK4)	43N 60W	20/0600	W 55	15.0/50
SeaLand Pride	38N 61W	20/1200	W 45	13.5/44
Lykes Motivator (WABU)	36N 57W	20/1700	W 45	13.0/42
Buoy 44011	41.1N 66.6W	19/1200	NW 43	8.5/28
			Peak gust 62	
		19/1500	NW 39	10.0/33
			Peak gust 56	
Buoy 44008	40.5N 69.4W	19/0200	N 35 G47	6.0/20
Buoy 44004	38.5N 70.5W	19/0100	N 45 G56	7.0/23

Table 2. Some ship and buoy observations taken during the storm of February 18–20, 2004.

reveals a large comma cloud with broad, cold-topped frontal bands north and east of the center. Some notable surface observations taken near the height of the storm are listed in *Table 2*.

The storm subsequently weakened to a gale as it passed over Newfoundland early on the 21st, before dissipating near Greenland on the 23rd.

**North Atlantic Storm of March 1–3:**  
This storm originated southeast of

Newfoundland near 40N 43W at 0000 UTC March 1 and moved northeast while deepening rapidly, with the central pressure falling 33 hPa to 965 hPa in twenty-four hours. *Figure 6* displays the development of this storm over a twenty-four hour period, with

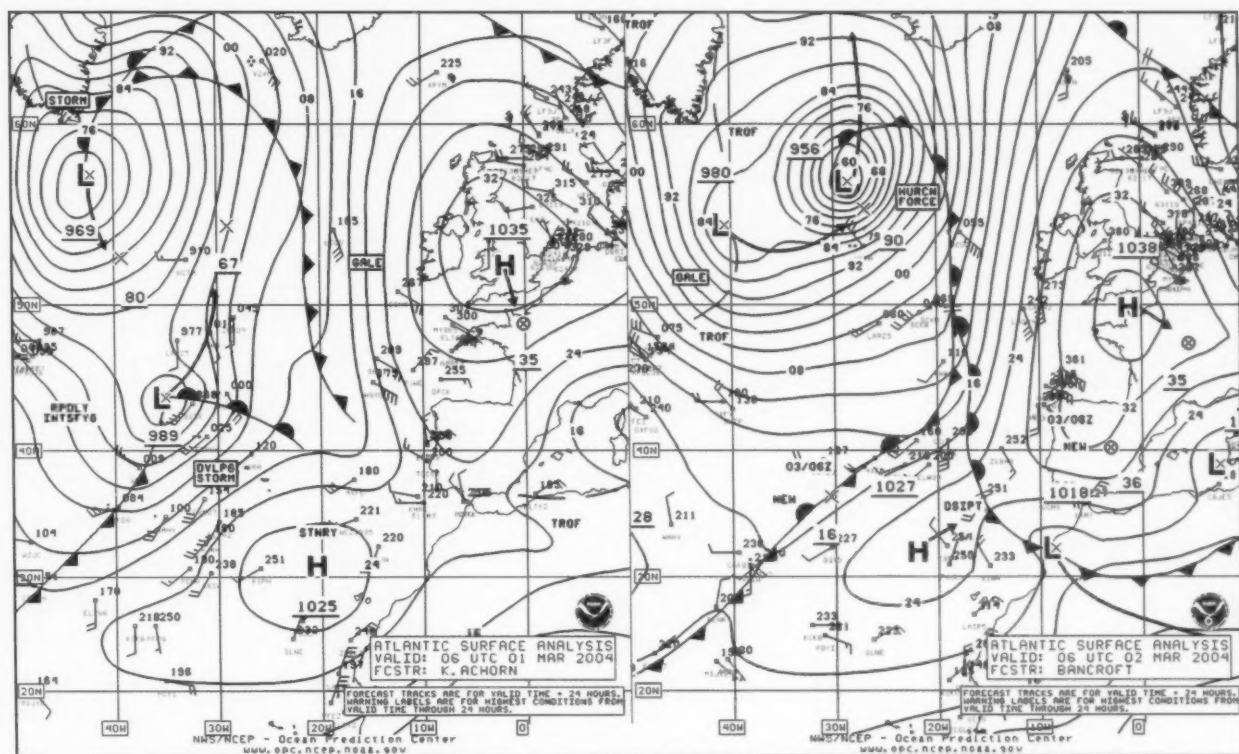


Figure 6. OPC North Atlantic Surface Analysis charts (Part 1) valid 0600 UTC March 1 and 2, 2004.

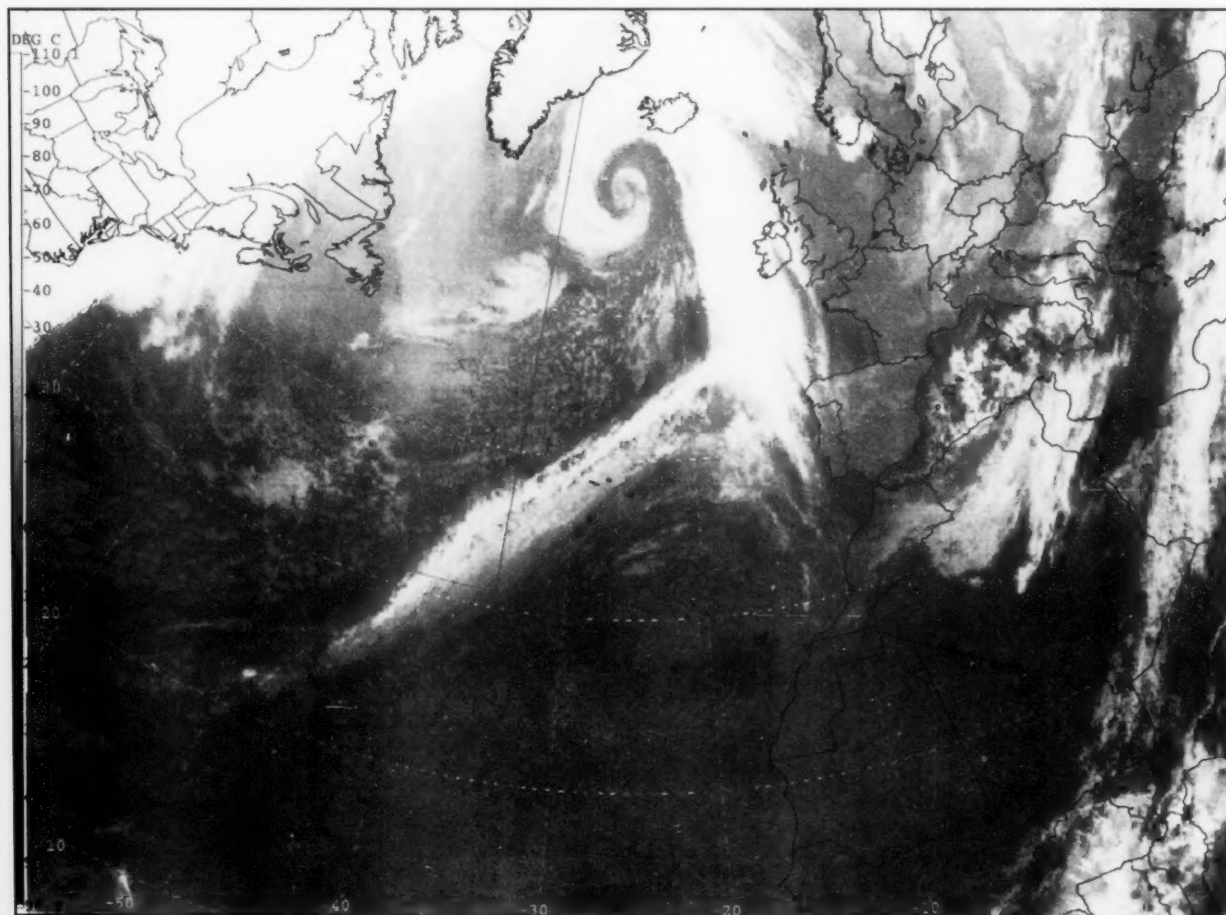


the central pressure bottoming out at 956 hPa at 0600 UTC March 2. The satellite image in **Figure 7** valid at that time shows a mature occluded system with a well-defined center and cloud spiral. The storm moved into an area with few ship reports, with the QuikSCAT image in **Figure 8** revealing several 60-kt wind barbs southeast of the center and a band of stronger winds farther east and southeast associated with the frontal zone. The storm center subsequently began to weaken while tracking north, and passed northwest of Iceland on March 3.

**North Atlantic Storm of March 7–9, 2004:** This developing storm tracked east across the Canadian Maritimes on March 6 and 7, passing over the island of Newfoundland early on the 7th and then reaching a maximum intensity of 964 hPa over the Grand Banks at 0600 UTC March 8. The Grand Banks oil platforms reported west to northwest winds of 50 to 55 kt after passage of the storm center, except that there was a 65 kt west wind report at Hibernia Platform (HP6038, 46.4N 48.4W) at 1200 UTC March 8. Six hours later the ship UBC Saiki (P3GY9) encountered a

west wind of 55 kt near 42N 40W. The system then weakened and elongated north-south over the central waters, blocked by high pressure over the eastern North Atlantic.

**North Atlantic Storm of March 8–12:** The next developing storm in the series, and the one following it, were not as intense as the one described above, but produced stronger winds as they tracked farther south over the warmer waters off the mid-Atlantic coast of the U.S. The next low originated as a coastal redevelopment of an interior system,



**Figure 7.** METEOSAT7 infrared satellite image valid 0600 UTC March 2, 2004. The valid time is the same as that of the second part of **Figure 6**.

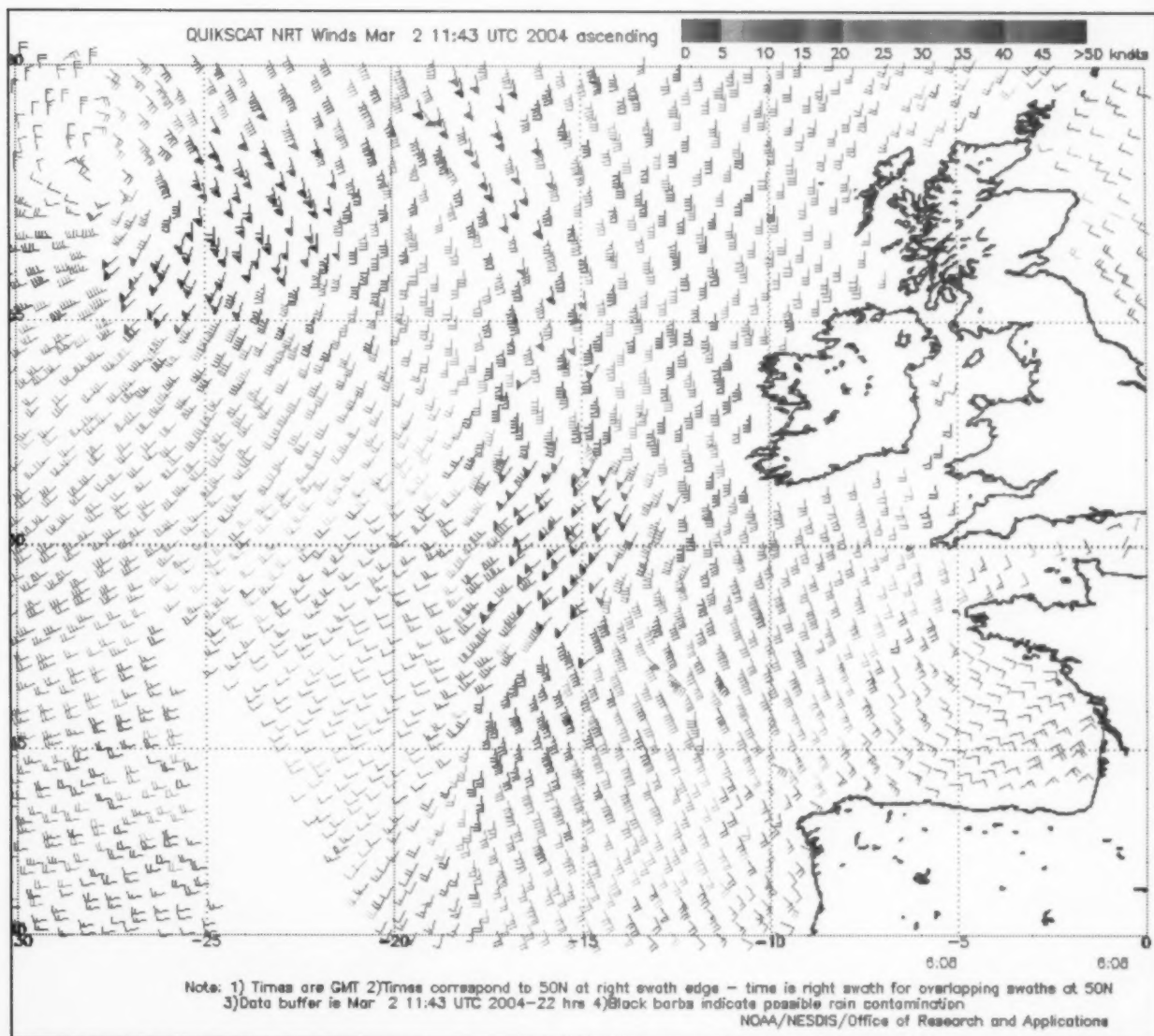


Figure 8. QuikSCAT scatterometer image of satellite-sensed winds valid at 0608 UTC March 2, 2004. The valid time is approximately that of the second part of Figure 6.

Image is courtesy of NOAA/NESDIS/Office of Research and Applications.

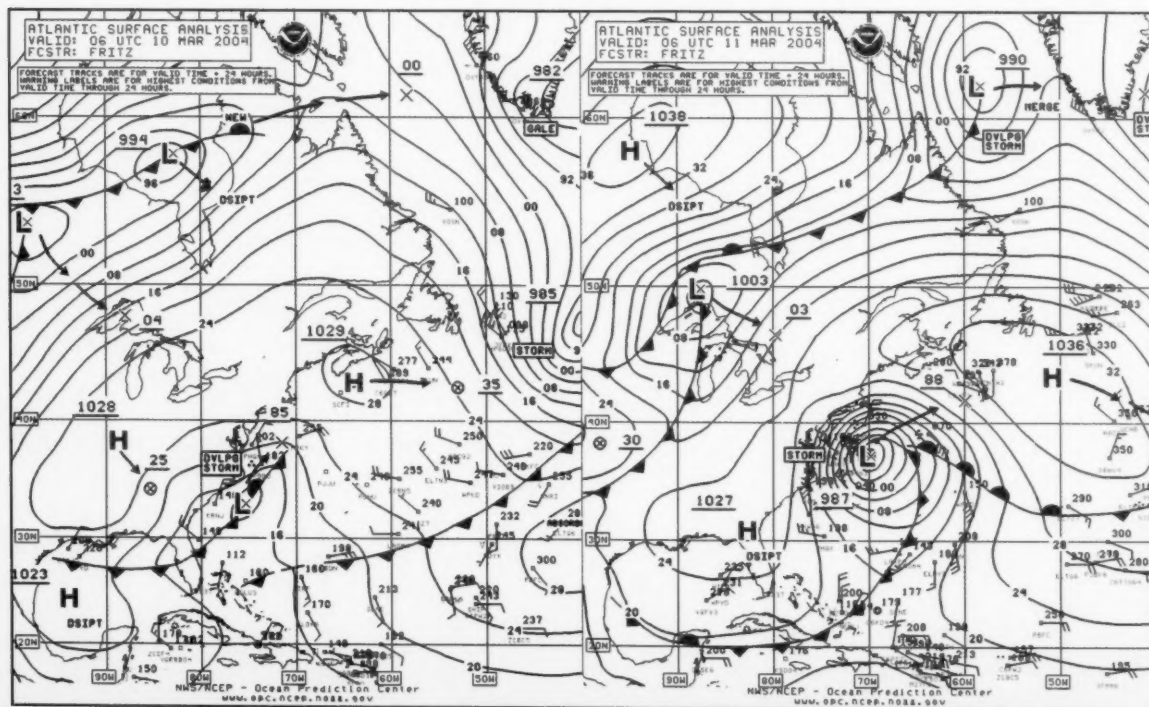
## Marine Weather Review



forming near the North Carolina coast by 0600 UTC March 8 and tracking east-northeast, with the central pressure dropping 17 hPa in the following twelve hours. **Buoy 41001** (34.7N 72.2W) reported sustained northwest winds of 35 kt and 7.5 m seas (25 ft) six hours later. At 0600 UTC March 9 the center was at 976 hPa near 41N 58W, with a high-resolution QuikSCAT pass at that time revealing winds to 70 kt south of the center (not shown). The strongest conventional wind report was from the ship **Genua Express** (PBKY) which reported southwest winds of 60 kt near 37N 63W at 1800 UTC March 8. The vessel TCAO reported seas of 11.5 m (37 ft) along with a west wind of 45 kt near 35N 67W at 0000 UTC March 9. The first part of **Figure 9** shows this

**Table 3. Ship, buoy and C-MAN station observations from the storm of March 10–11.**

OBSERVATION SEAS(m/ft)	POSITION	DATE/TIME(UTC)	WIND(kt)
M/V Freedom (WDB5483)	37N 72W	11/0600	N 55
Maersk Missouri ( WAHV)	36N 72W	11/1200	NW 60
Maersk Missouri ( WAHV)	36N 69W	11/1800	NW 55
Chesapeake Light (CHLV2 C-MAN)	36.9N 75.6W	10/2000 10/2300	N 46 G52 4.0/13 5.0/16
Buoy 44014	36.6N 74.8W	11/0000 11/0200	N 41 G49 6.5/21 Peak gust 52 7.0/23
Buoy 41002	32.3N 75.2W	11/0100 11/0600	NW 35 G45 5.5/18 6.5/21
Buoy 44004	38.5N 70.5W	11/0200 11/0000	NE 45 G54 9.5/31 Peak gust 60
Buoy 44011	41.1N 66.6W	11/0900 11/1600	NE 37 G51 5.5/18 8.5/28
Buoy 44008	40.5N 69.4W	11/1200	N 39 G56 8.5/28
Buoy 41001	34.7N 72.2W	11/1000	NW 39 G49 8.5/28



**Figure 9. OPC North Atlantic Surface Analysis charts (Part 2) valid 0600 UTC March 10 and 11, 2004.**

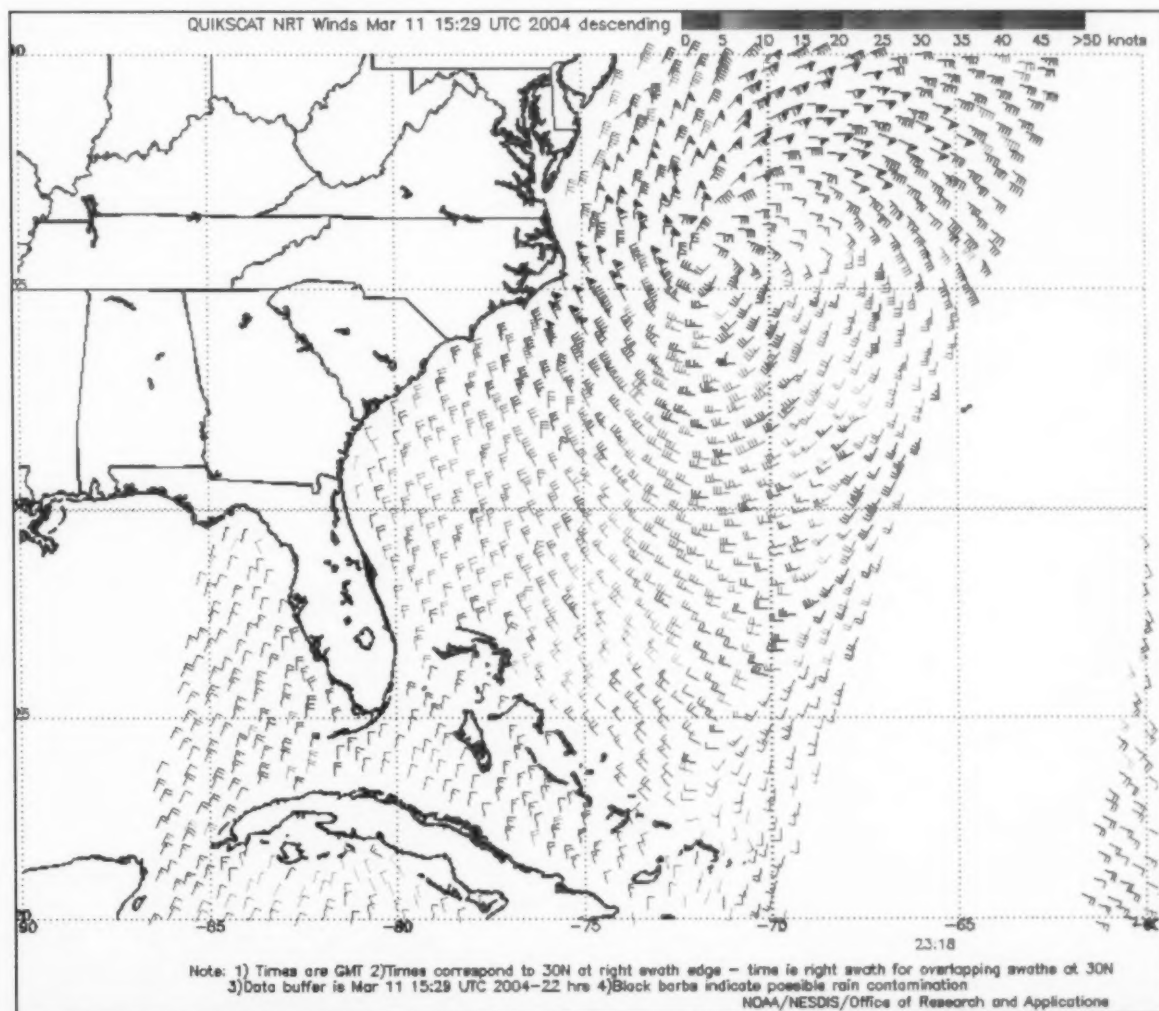


storm passing east of the Grand Banks near the edge of the chart. The storm then weakened to a gale over the central North Atlantic on the 9th, before turning north and looping southwest of Iceland as a storm on the 11th and 12th. The system then weakened to a gale and passed north of Great Britain early on March 15.

**Western North Atlantic Storm of March 10–11:** This storm developed early soon after moving off the south-east U.S. coast and was relatively

short-lived as a storm, but was compact and potent. **Figure 9** depicts the rapid spinup of this storm over a twenty-four hour period ending at 0600 UTC March 11, with the central pressure dropping 24 hPa in the twenty-four hour period ending at 0600 UTC March 11. Some notable ship and buoy data obtained during the storm are listed in **Table 3**. Although none of the available reports have sustained winds above 60 kt, the QuikSCAT image in **Figure 10**

reveals winds of up to 70 kt from the east or northeast north of the storm center. Although the central pressure was lowest when the center passed east of the island of Newfoundland late on the 13th (982 hPa at 0000 UTC March 14), the circulation had broadened and was over cold water by then and winds were down to gale force. Encountering the blocking high pressure over the eastern North Atlantic, the system elongated and passed east of Iceland on March 17. ↓



**Figure 10.** (above) QuikSCAT scatterometer image of satellite-sensed winds valid at 2318 UTC March 10, 2004. The valid time is approximately seven hours prior to that of the second surface analysis in **Figure 9**.

Image is courtesy of NOAA/NESDIS/Office of Research and Applications.



# Marine Weather Review—North Pacific Area January to April 2004

By George P. Bancroft, National Center for Environmental Prediction

## Introduction

The most active period of winter storms was January through the middle of March, when low-pressure systems tracked east and northeast off Japan toward Alaska and occasionally taking northward turns into the Bering Sea where they weakened. Most of the hurricane-force events occurred during this period. The pattern became more variable in March and April with blocking becoming more frequent. The period from late March through April featured two hurricane-force storms, one in the eastern Pacific in late March and the other in

the northwest Pacific and western Bering Sea, with both described in this summary. Tropical cyclones are relatively infrequent this time of year, with activity picking up as the year progresses. One such system, Sudal, occurred in April and is also described below.

## Tropical Activity

**Typhoon Sudal:** Sudal appeared about 700 nmi south of Japan on OPC's oceanic analysis charts as a typhoon early on April 14 with maximum sustained winds of 105 kt and gusts to 130 kt. By 1200 UTC April 15 Sudal

weakened to a tropical storm near 25N 143E with maximum winds of 55 kt and gusts to 70 kt, and then became extratropical six hours later while merging with a frontal zone. **Figure 1** depicts Sudal becoming an extratropical storm over a 36-hour period, about to enter OPC's high seas area of responsibility (see Reference). Ship data was sparse and mainly around the periphery of the storm, but QuikSCAT scatterometer data about the time of the second part of **Figure 1** indicated a small area of storm force winds up to 60 kt just north of the center. The cyclone then gradually weakened while tracking northeast,

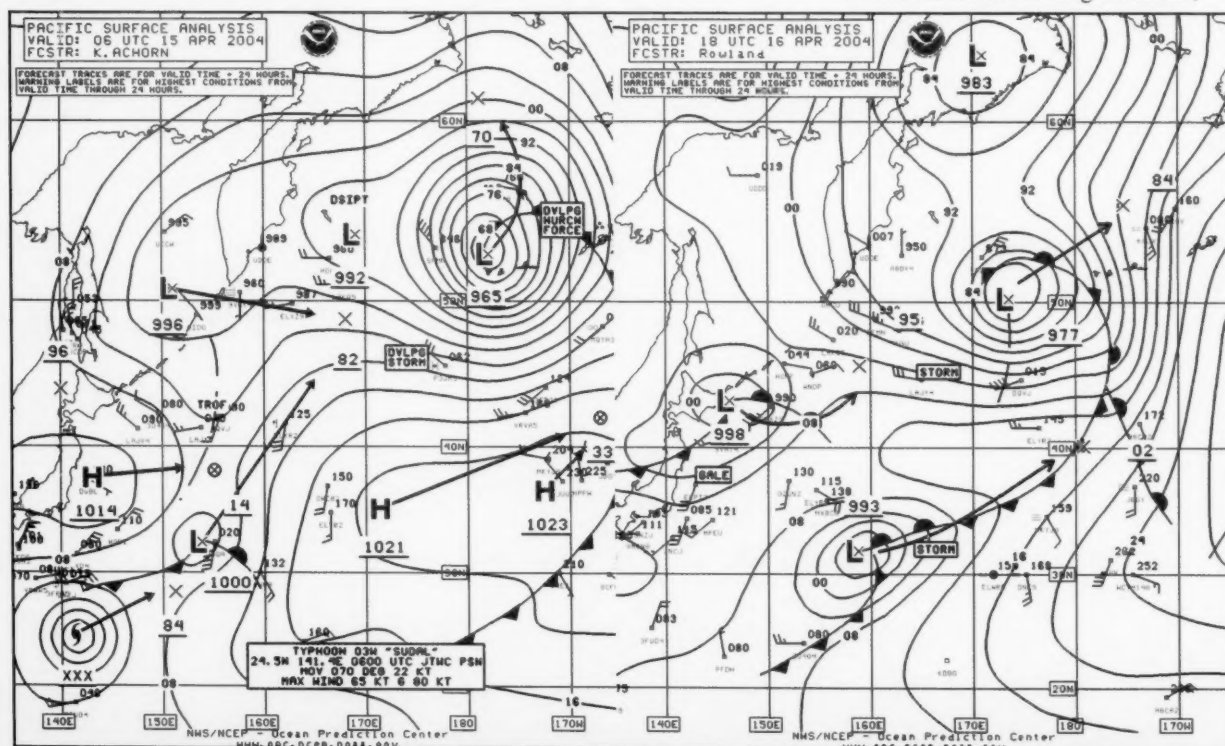


Figure 1. OPC North Pacific Surface Analysis charts (Part 2) valid 0600 UTC April 15 and 1800 UTC April 16, 2004. Typhoon Sudal is shown becoming an extratropical storm.

becoming a gale-force low near the dateline at 1800 UTC April 17. A ship, **Niitaka Maru** (JBGY), reported a southwest wind of 40 kt near 36N 180 at that time. The system re-intensified into a storm twenty-four hours later while crossing 150W, and developed a central pressure down to 973 hPa near 50N 147W at 0000 UTC on the 19th. The cyclone then weakened while turning more southeast, and dissipated near the Oregon coast on the 21st.

<u>OBSERVATION</u>	<u>POSITION</u>	<u>DATE/TIME(UTC)</u>	<u>WIND</u>	<u>SEAS(m/ft)</u>
<b>Star Eagle</b> (LAWO2)	35N 177E	08/0000	NW 55	10.0/33
<b>SeaLand Explorer</b> (WGJF)	42N 179E	08/0000	E 50	13.0/42
<b>APL Tourmaline</b> (9VVP)	36N 178E	08/0600	W 50	12.5/41
<b>Star Eagle</b> (LAWO2)	35N 177E	08/0600	W 50	9.0/30
<b>SeaLand Explorer</b> (WGJF)	42N 175W	08/0600	E 60	8.0/27
<b>SeaLand Explorer</b> (WGJF)	42N 179W	08/1200	NE 60	15.5/51

Table 1. Some notable ship observations in the storm of January 7-9.

### Other Significant Events

### North Pacific Storm, January 7-9:

The first half of January was quite active, with several lows developing hurricane-force winds while moving over the western and central North Pacific, near the latitude of Japan. The first of these is shown in **Figure 2**.

developing rapidly from a frontal wave well southeast of Japan over a thirty-six hour period to become a hurricane-force storm near the date-line. QuikSCAT data available at 1800 UTC January 8 south of the center showed winds to 65 kt, and is not shown here (see **Figure 9** for a simi-

lar event in mid-March in that same area.) Some notable ship reports in this storm are tabulated in *Table 1*, including multiple reports from the same ship. The central pressure reached 971 hPa near 38N 172W at 0000 UTC January 9 before the system began to weaken, becoming a

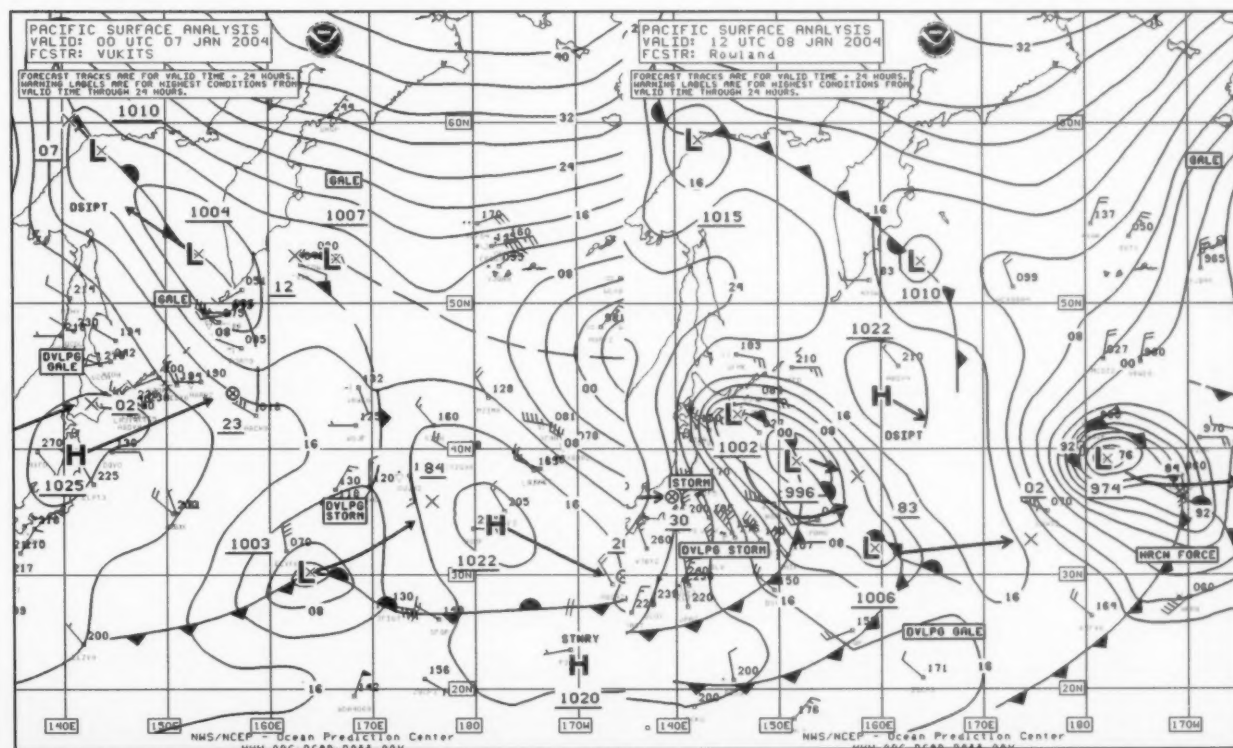


Figure 2. OPC North Pacific Surface Analysis charts (Part 2) valid 0000 UTC January 7 and 1200 UTC January 8, 2004.

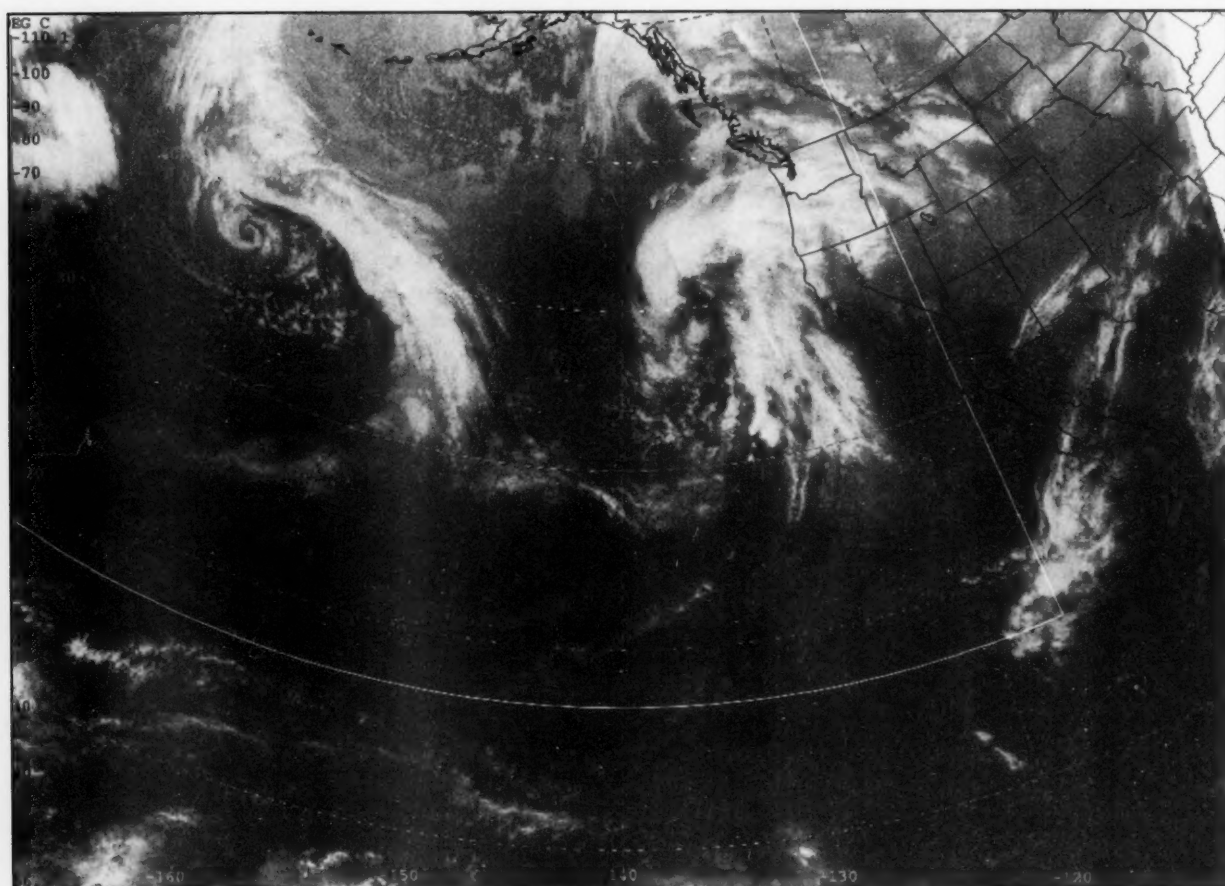


Figure 3. GOES-10 infrared satellite image valid at 0000 UTC January 9, 2004 showing the storm of Figure 2 fully developed and near maximum intensity. The satellite senses temperature on a gray scale ranging from black (warm) to white (cold) in this type of imagery, with high clouds showing up near the cold end of the range.

gale near 40N 147W thirty-six hours later before turning north. **Figure 3** is a GOES-9 infrared image showing the storm fully developed and at maximum intensity, with a well-defined cloud spiral marking the center.

**Western North Pacific Storm of January 8–11:** Another storm immediately following the one above took a more east-southeast track off northern Japan by early on the 8th (second part of **Figure 2**), and developed hurricane-force winds briefly early on the 10th. The **Star Eagle** (LAWO2) encountered north winds of 65 kt near 36N 167E at 1200 UTC January 10,

while the vessel **Port Said Senator** (DQVN) reported west winds of 50 kt down near 31N 164E. The lowest central pressure was 976 hPa when the center was at 36N 171E six hours later. The cyclone then turned more northeast and weakened to a gale near 41N 170W early on the 12th, before elongating and turning north into Southeast Alaska on the 14th.

**North Pacific Storm of January 10–16:** This storm developed quickly after moving east of northern Japan on January 10. By 0600 UTC January 11 the center was at 42N 149E with a 993 hPa central pressure. The **APL**

**Philippines** (WCX8884) encountered northwest winds of 60 kt near 38N 147E at that time. The system tracked initially east-southeast through the 13th, before turning northeast and deepening to 968 hPa near 42N 157W at 0600 UTC January 15. OPC classified the storm as hurricane-force at that time, before the system expanded in area and winds weakened to gale force late on the 16th. The weakening low moved into Alaska on the 18th.

**Western North Pacific Storm of January 13–17:** This cyclone was a rapid deepener with much of the intensification occurring just east of

Japan. A warm ocean current, the Kuroshio, often aids the rapid development of lows passing through this area. **Figure 4** depicts the development with the merger of two lows with the central pressure dropping 35 hPa in the twenty-four hour period ending at 0000 UTC on the 14th. The **Swift Arrow** (C6N17) reported a northwest wind of 65 kt near 42N 146E, just west of the center, at 0000 UTC January 14, while the **Ming Dynasty** (P3BA7) encountered east winds of 55 kt at 45N 150E. The system then moved east and expanded, with winds weakening to gale force at 0000 UTC January 19 with the center passing 46N 175W. The center then stalled near the dateline, becoming a large gale with central pressure as low as 961 hPa at 1200 UTC on the 19th. The system developed secondary storm centers to the east, passing north into the Gulf of Alaska on the

20th. The system as a whole weakened into multiple centers sprawled across the area north of 50N east of the dateline late on January 21.

**North Pacific Storms, February 7–14:** The first storm in the series developed south of a complex area of low pressure in the Aleutians, near 40N 177W at 0000 UTC on the 7th, and tracked northeast toward the eastern Aleutians in the next twenty-four hours before weakening in the Bering Sea late on the 8th. The central pressure was as low as 956 hPa near 53N 162W at 0600 UTC February 8, when OPC analyzed it as a hurricane-force storm. The highest wind report from a ship was a southwest wind of 50 kt from **Singapore Bay** (MRGU3) near 54N 157W at 1200 UTC on the 8th. Three other storms followed through the 14th, taking similar tracks but not quite as intense, with the second pass-

ing south of Kodiak Island early on the 10th before weakening near the southwest Alaska coast at 0000 UTC February 11. The **CSX Tacoma** (KGTU) reported an east wind of 60 kt near 57N 150W at 0600 UTC on the 10th.

**Western North Pacific Storm of February 14–19:** This system crossed northern Japan as a storm on the 14th and gradually deepened but with its circulation expanding in area. The center deepened from 982 hPa near northern Japan at 0000 UTC on the 15th to 966 hPa near 41N 157E twenty-four hours later. By 0600 UTC February 17 the central pressure bottomed out at 950 hPa near 44N 178E. This was the lowest pressure attained by any low in the North Pacific during the four-month period. The highest winds with the large circulation occurred in secondary lows east of the

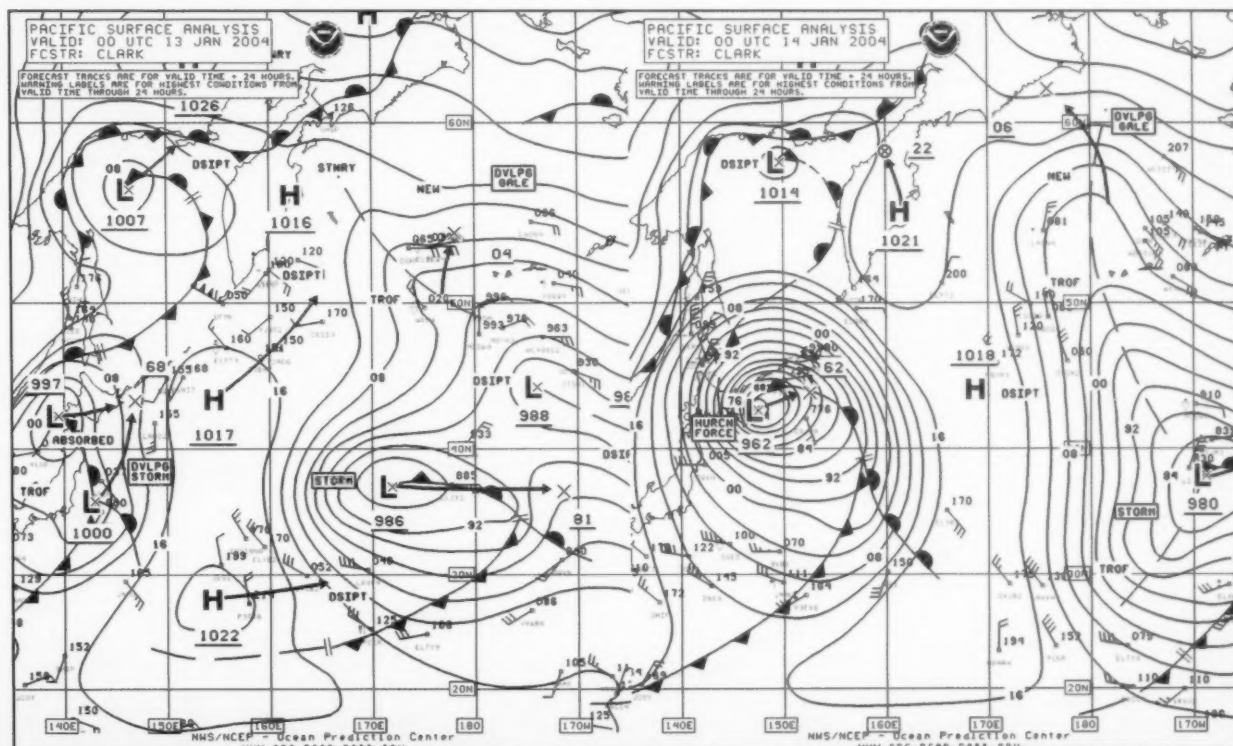


Figure 4. OPC North Pacific Surface Analysis charts (Part 2) valid 0000 UTC January 13 and 14, 2004.



main center. The **Providence Bay** (MSTM6) and the **Colombo Bay** (MTFH5) encountered southwest winds of 60 kt, at 1800 UTC on the 18th near 36N 175W and at 1800 UTC on the 19th near 48N 155W, respectively. These were the highest observed winds. The circulation covered much of the North Pacific by the 18th. The main center then moved

south of the Aleutians and dissipated south of the Gulf of Alaska on February 22.

**Eastern North Pacific and Offshore Storm of February 15–17:** The rapid development of this hurricane-force storm is depicted in **Figure 5**. The central pressure dropped an impressive 39 hPa in the twenty-four hour

period ending at 0600 UTC February 16, with the central pressure lowering further to 958 hPa 450 nmi west of Vancouver Island at 0000 UTC on the 17th. The **Kauai** (WSRH) reported southeast winds of 60 kt near the Oregon Coast at 0600 UTC on the 16th (**Figure 5**), and the ship **CSX Reliance** (WFLH) encountered east winds of 50 kt at 49N 127W six hours

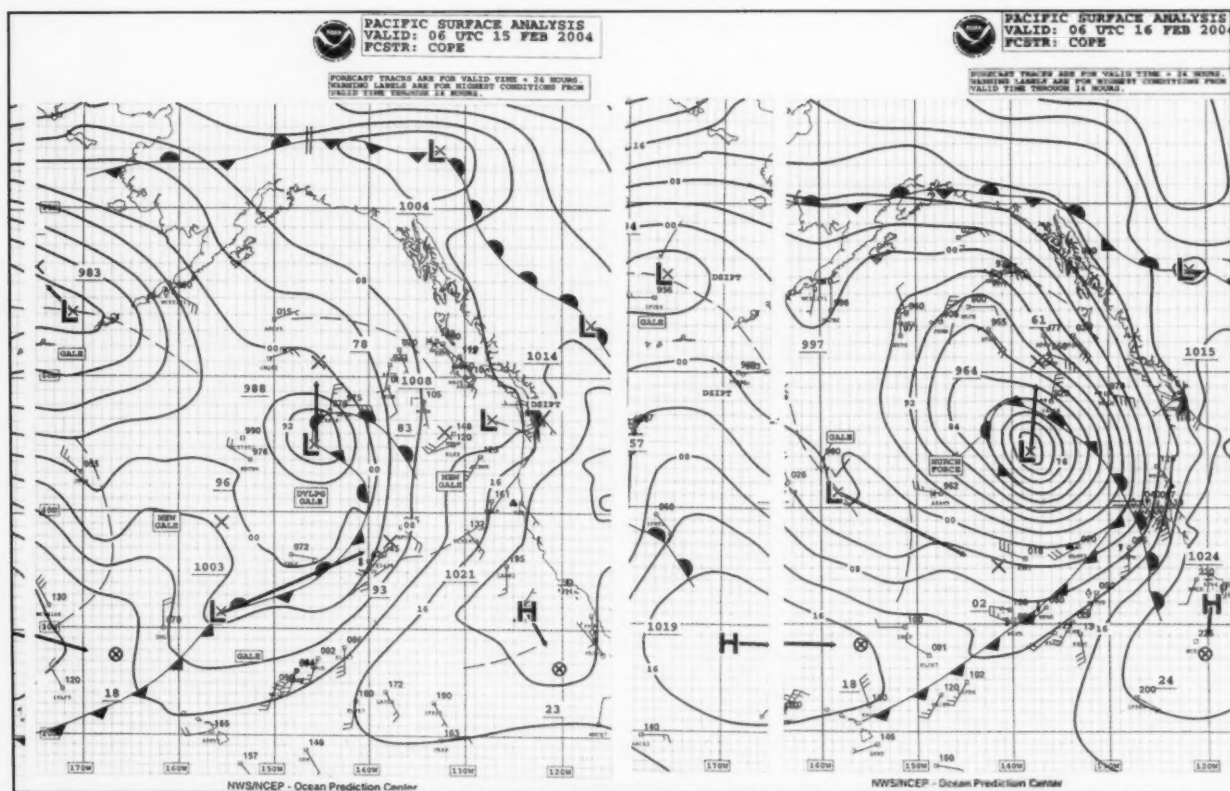


Figure 5. OPC North Pacific Surface Analysis charts (Part 1) valid 0600 UTC February 15 and 16, 2004.



later. The moored buoy 46006 (40.8N 137.5W) reported a west wind of 60 kt with gusts to 76 kt and 9.0m seas (30 ft) at 0500 UTC February 16. The maximum significant wave height was

11.0 m (36 ft) two hours later. A QuickSCAT image taken near this time (*Figure 6*) reveals hurricane-force winds southeast of the center, up to 70 kt. This storm was the deepest

in this part of the Pacific during the period and had the highest rate of intensification. The storm subsequently weakened, and dissipated over Southeast Alaska on the 18th.

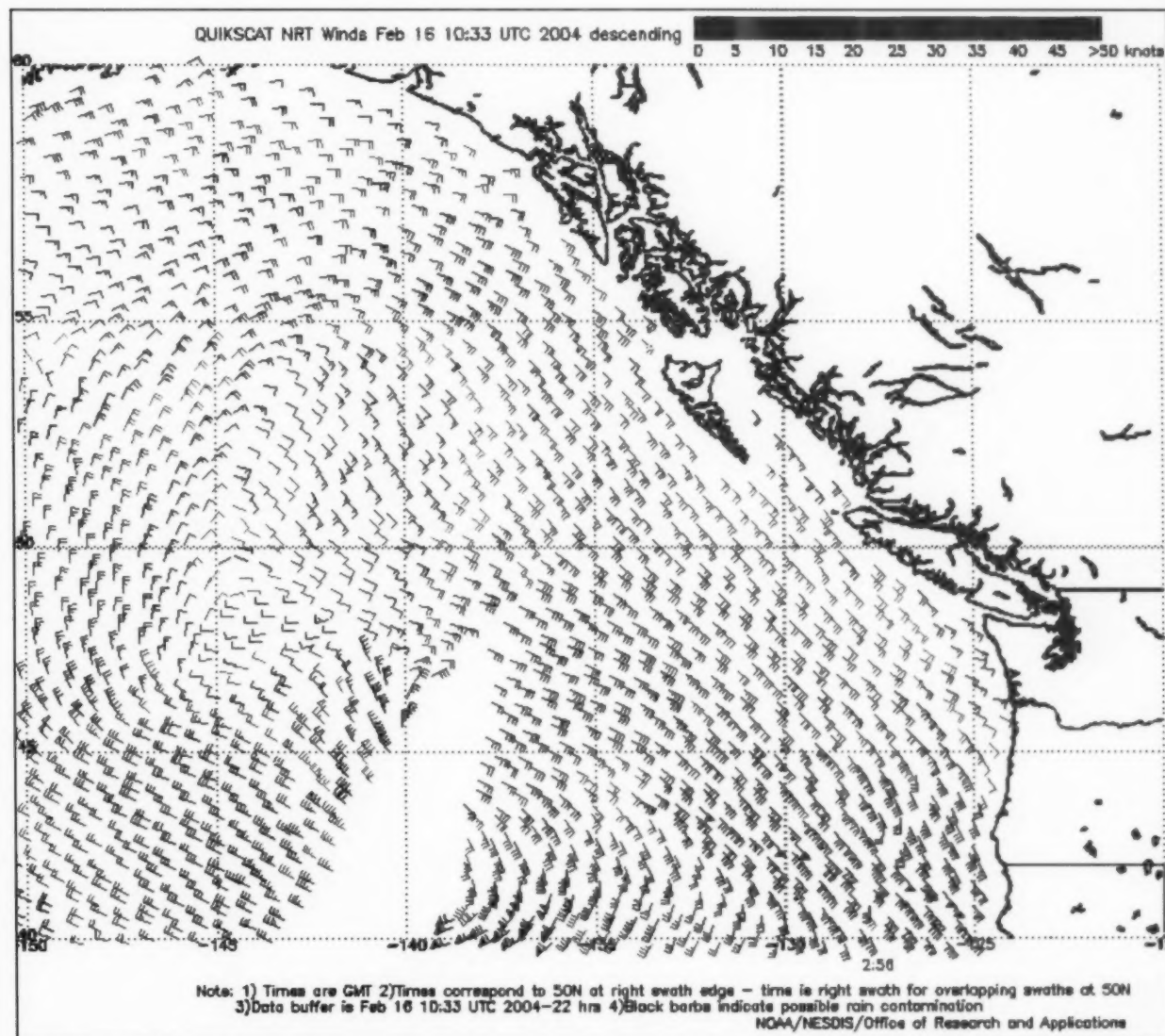


Figure 6. QuikSCAT scatterometer image of satellite-sensed winds around the storm shown in *Figure 5*. The valid time of the pass is 0256 UTC February 16, 2004, or about three hours prior to that of the second part of *Figure 5*. The center of the storm is near the bottom of the figure, in the swath with no wind bars.

Image is courtesy of NOAA/NESDIS/Office of Research and Applications.

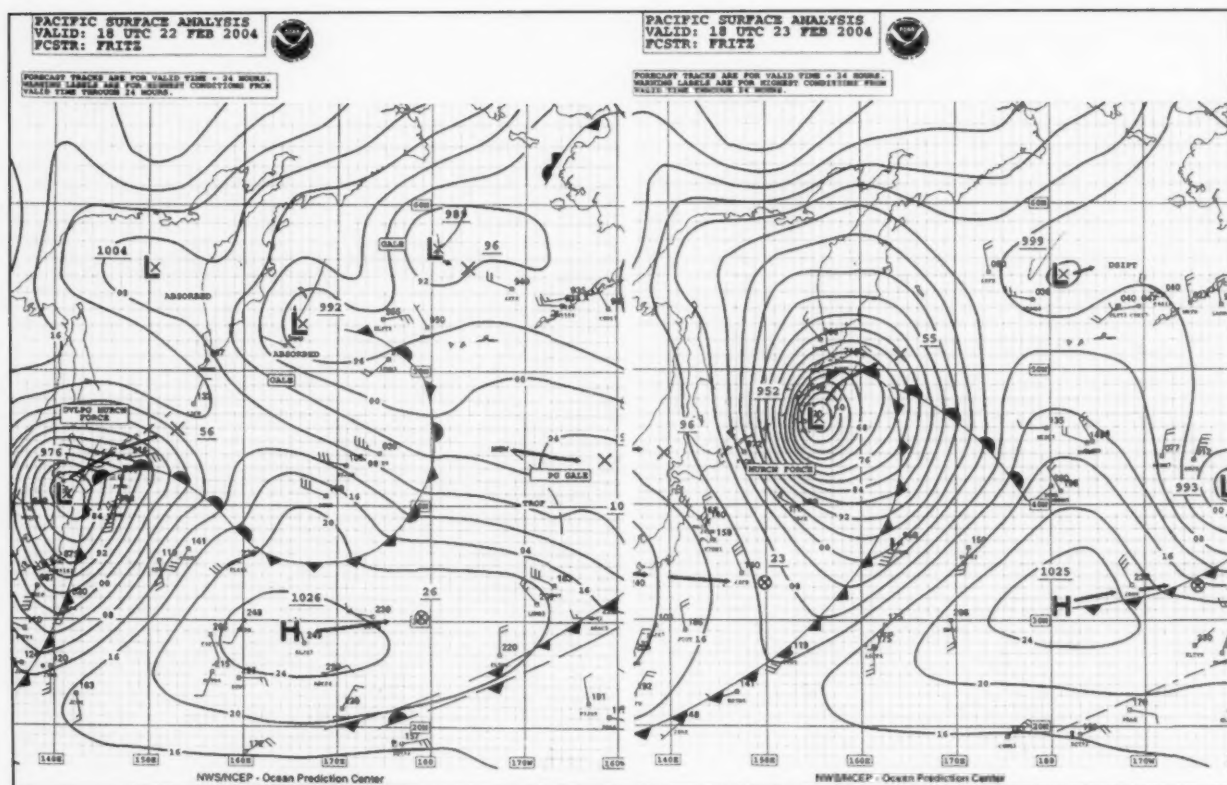


Figure 7. OPC North Pacific Surface Analysis charts (Part 2) valid 1800 UTC February 22 and 23, 2004.

**Northwestern North Pacific Storms of February 22–28:** The storm depicted in *Figure 7* was one of the deepest of the period. It developed a tight pressure gradient (close packing of isobars) west of the center similar to the January 13–17 storm but farther north, near the Kurile Islands. The central pressure remained in the 950s as the center passed southeast of the Kamchatka Peninsula through the 24th. The **Zim Italia** (4XGT) reported northwest winds of 60 kt near 47N 153E at 0000 UTC February 24. Six

hours later, the **SeaLand Endurance** (KGJX) and the **CSX Liberator** (KHRP) encountered northwest winds of 60 kt near 38N 158E and 46N 153E, respectively. The storm later weakened to a gale in the northwest Bering Sea by the 26th. A second storm followed a similar track and was almost as intense, developing a central pressure of 955 hPa near 50N 159E at 1200 UTC February 27. At that time the vessel **APL Thailand** (WCX8882) reported northeast winds of 60 kt near 51N 157E. At 0000

UTC on the 28th, the **OOCL Singapore** (VRVL2) experienced northwest winds of 65 kt near 47N 153E. The ship **Westwood Columbia** (C6SI4) reported 13.5m seas (44 ft) along with northeast winds of 50 kt near 50N 159E at 1800 UTC February 27. The storm then developed multiple centers while weakening to a gale just south of the western Aleutians by the 29th, before moving into the Bering Sea on March 1.

**Northeast Pacific Storm of March 6-8:** The month of March featured three main events, with the first originating southeast of Japan at 0000 UTC March 4. The deepening low moved rapidly northeast, becoming a storm early on March 6 upon crossing 50N, and then a hurricane-force storm with a central pressure as low as 961 hPa 300 nmi south of Kodiak Island

at 1800 UTC March 6. **Figure 8** shows the development of this system over a 36-hour period, including a twenty-four hour period ending at 1200 UTC on the 6th when the central pressure dropped 26 hPa. There was a ship observation with hurricane-force winds at 0600 UTC March 7, when the **Saga Horizon** (VRUZ9) reported west-southwest winds of 65 kt near

52N 143W. The ship A8CN7 to the east encountered 9.5m seas (31 ft) along with south winds of 40 kt near 54N 136W at that time. The same ship six hours later reported southwest winds of 55 kt at 53N 136W. The cyclone then continued on a northeast track and weakened onshore on the Alaska coast as the 24-hour forecast track in **Figure 8** indicated.

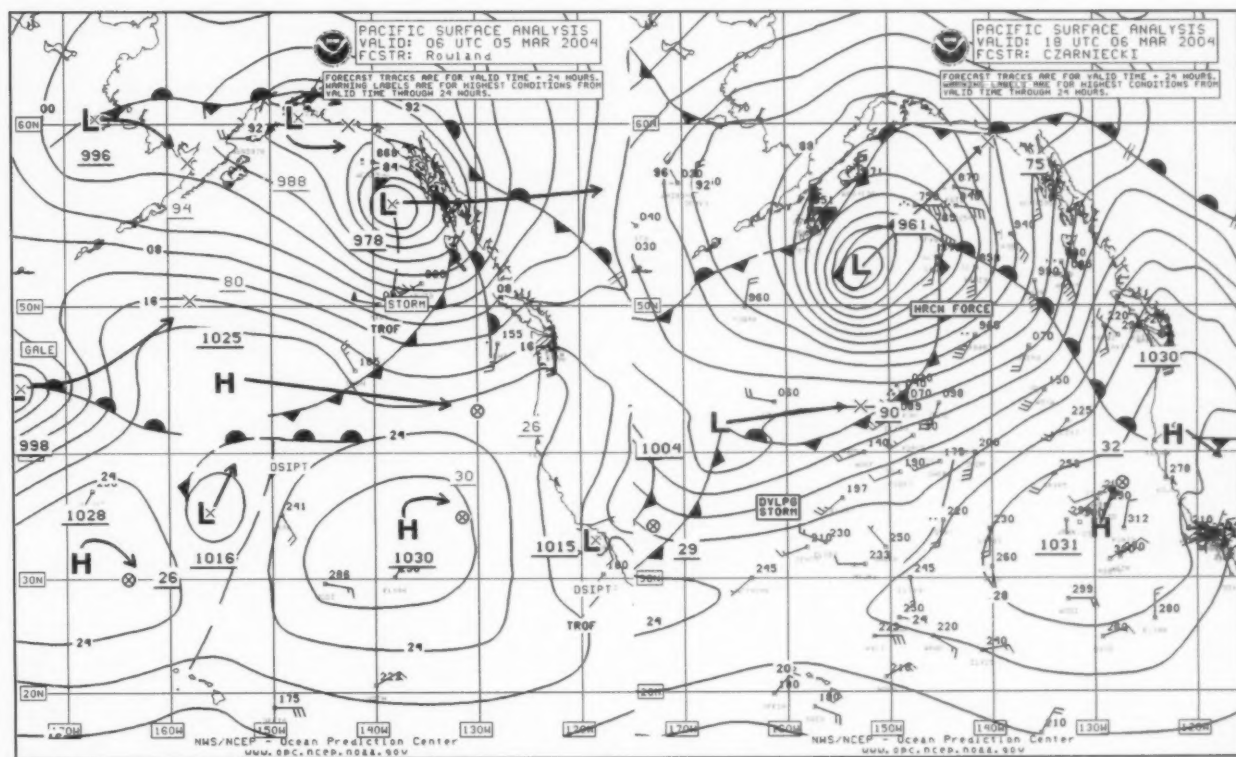


Figure 8. OPC North Pacific Surface Analysis charts (Part 1) valid 0600 UTC March 5 and 1800 UTC March 6, 2004.



**Southwest North Pacific Storm, March 16–18:** This major storm formed relatively far south, originating from a frontal wave of low pressure southwest of OPC's high seas

area of responsibility. The southwest corner of the high seas area is at 30N 160E. **Figure 9** displays the period of most rapid development, when the central pressure dropped 20 hPa in

twenty-four hours. Forming in a high-pressure environment, the storm developed hurricane-force winds even though the lowest central pressure was only 982 hPa, reached at 1800

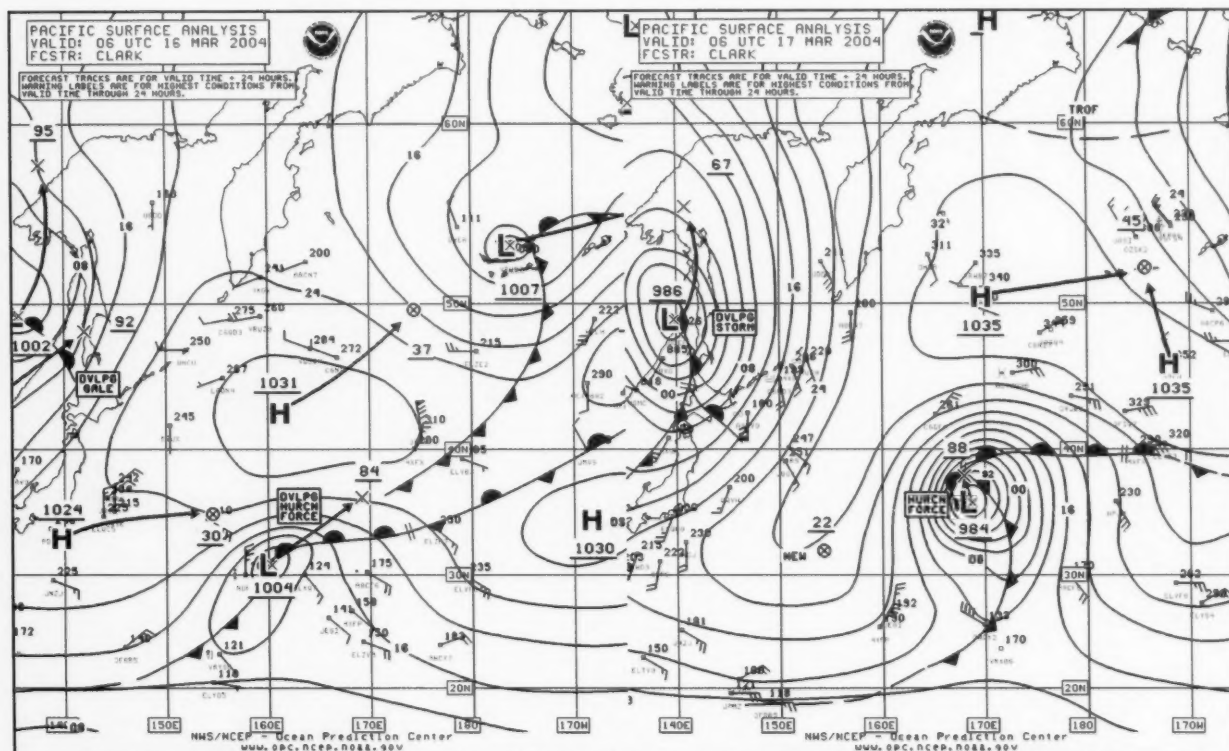


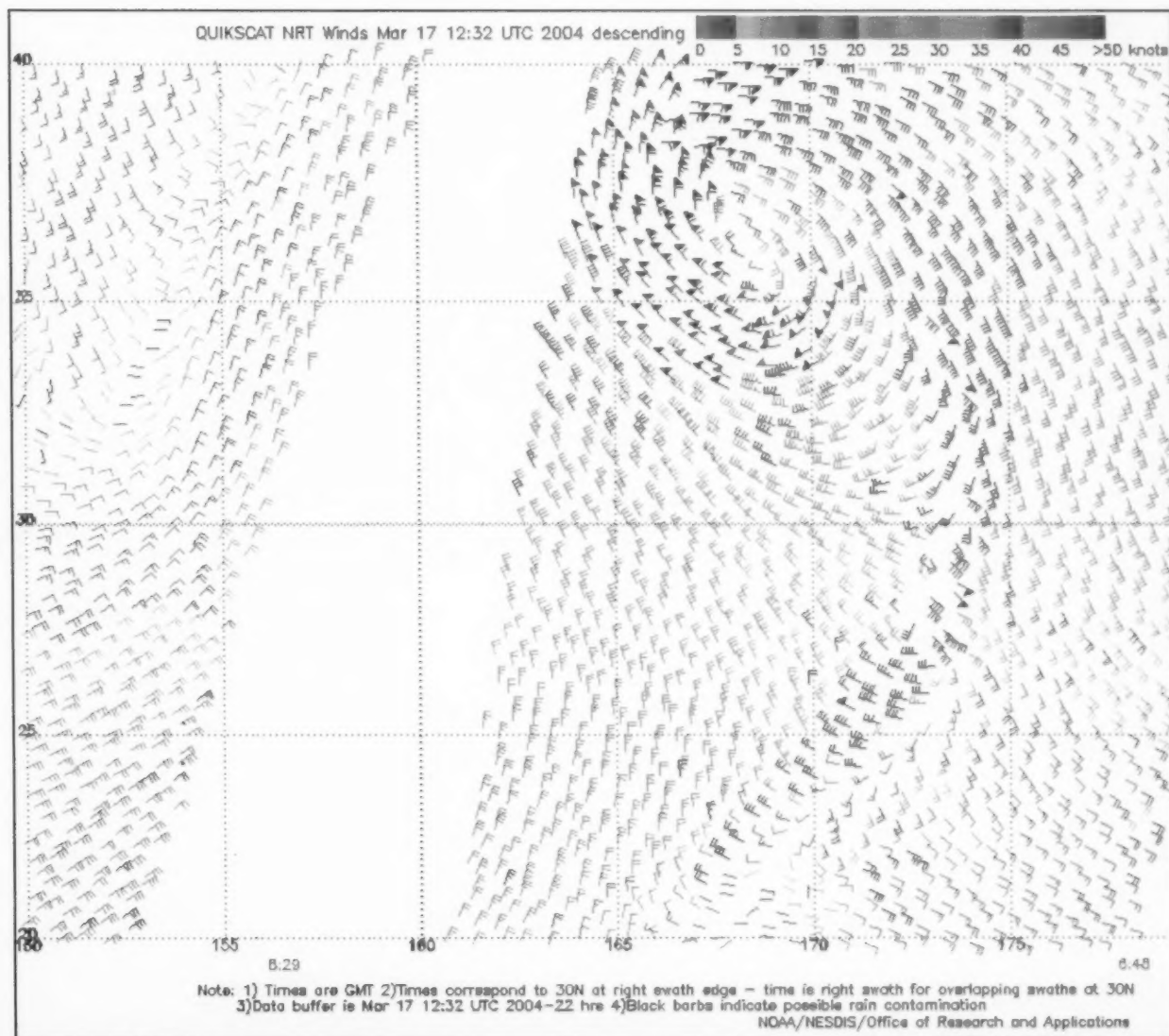
Figure 9. OPC North Pacific Surface Analysis charts (Part 2) valid 0600 UTC March 16 and 17, 2004



UTC March 17. With ship data lacking in this area, the QuikSCAT data in **Figure 10** valid close to the time of the second part of **Figure 9** reveals

numerous 60 kt wind barbs around the north, west and south sides and even a few 65 kt barbs. Building high pressure to the north and east caused the

low to stall on the 17th, weakened to a gale-force low on the 18th, and then begin a northwestward drift by March 19.



**Figure 10.** QuikSCAT scatterometer image of satellite-sensed winds around the storm shown in **Figure 9**. The valid time of the pass is 0648 UTC March 17, 2004, or less than an hour later than the valid time of the second part of **Figure 9**. The center of the storm is near 36N 169E.

Image is courtesy of NOAA/NESDIS/Office of Research and Applications.

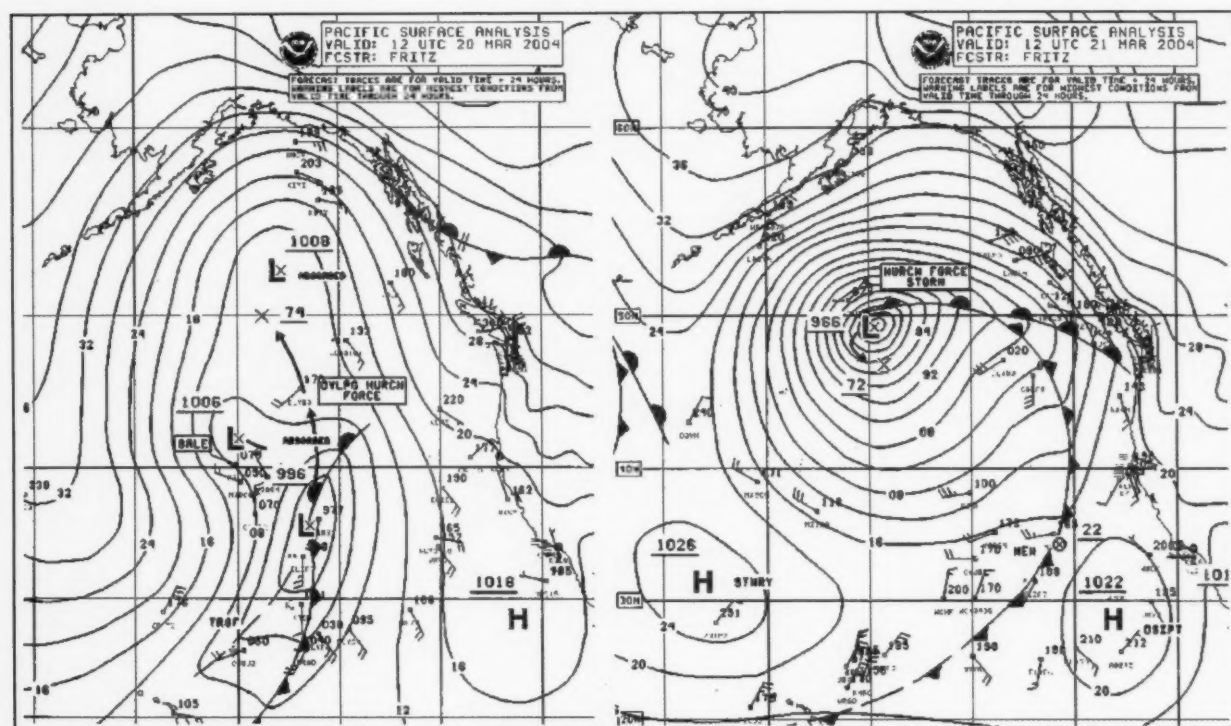
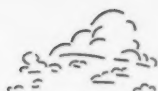


Figure 11. OPC North Pacific Surface Analysis charts (Part 1) valid 1200 UTC March 20 and 21, 2004.

OBSERVATION	POSITION	DATE/TIME(UTC)	WIND	SEAS(m/ft)
APL China (WDB3161)	51N 152W	21/1200	NE 57	
Westwood Borg (LAON4)	54N 161W	21/1200	NE 54	
Buoy 46066	52.7N 155W	21/1600	NE 43 G52	10.0/33
		21/2000	Peak gust 60	12.5/41
Westwood Borg (LAON4)	54N 158W	22/0600	NE 45	13.0/43
OOCL France (A8AV9)	40N 154W	22/0600	NW 45	10.5/35
APL China (WDB3161)	50N 163W	22/1200	N 40	10.5/35

Table 2. Some ship and buoy observations taken in the eastern Pacific storm of March 20–22, 2004.

**Eastern North Pacific Storm of March 20–22:** This developing storm originated near Hawaii and rapidly intensified while tracking north on March 20. **Figure 11** shows the period of most rapid intensification. The second part of **Figure 11** shows the storm at maximum intensity. Strong high pressure to the north blocked the storm, forcing it to slow and make a loop to the southwest and then east. **Figure 12** is a GOES-10 infrared satellite image of the storm near maximum intensity. Enhancement of colder temperatures reveals the higher, colder cloud tops in the frontal band, and there is a pronounced cloud spiral around the center. **Table 2** lists some notable ship and buoy observations in this storm. The system then weakened while drifting east along 47N and weakened to a gale late on March 22, and became absorbed by another low moving from the south by the 25th.

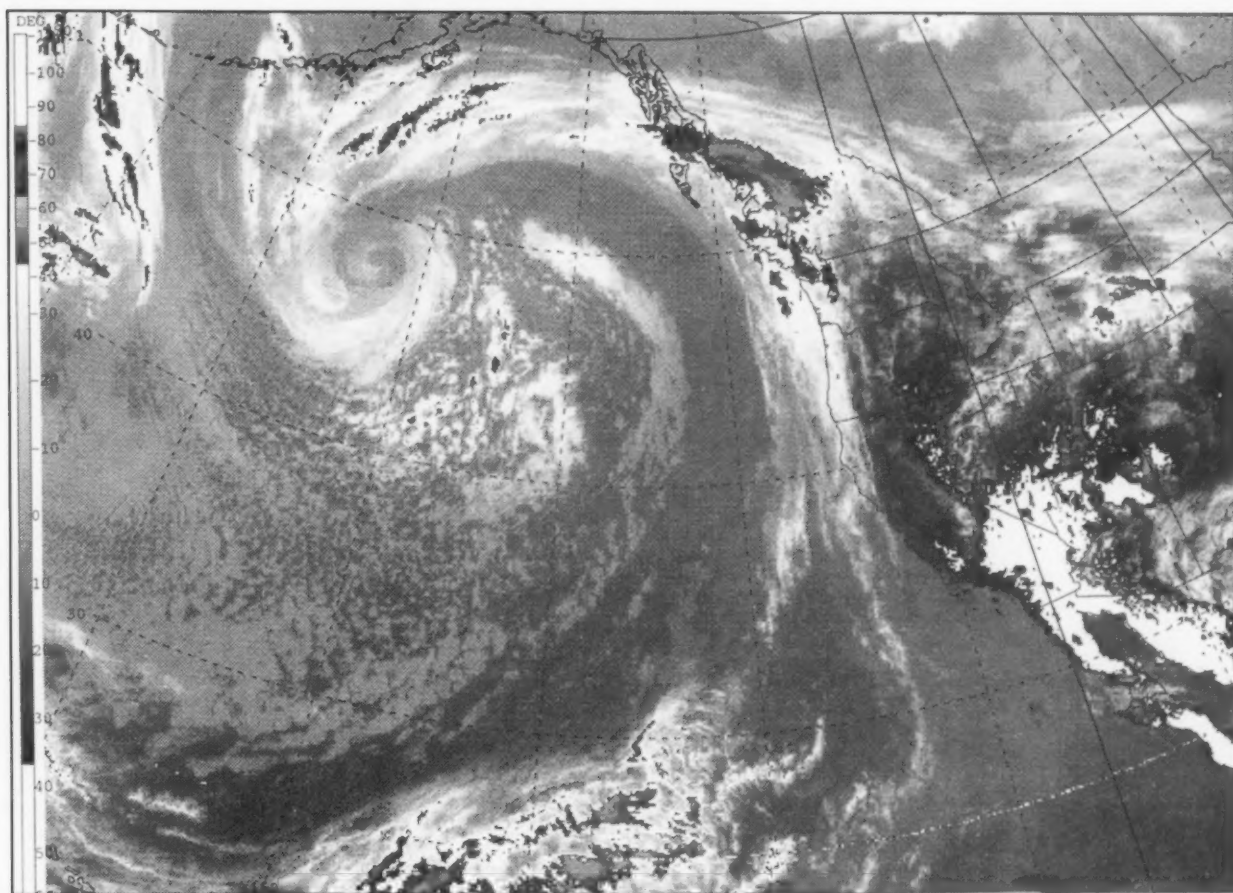


Figure 12. GOES-10 enhanced infrared satellite image valid at 2100 UTC March 21, 2004 showing the storm of *Figure 11* fully developed. Colder temperatures (such as in the frontal cloud band) are computer-enhanced to show contrast, according to the temperature scale on the left edge of the image.

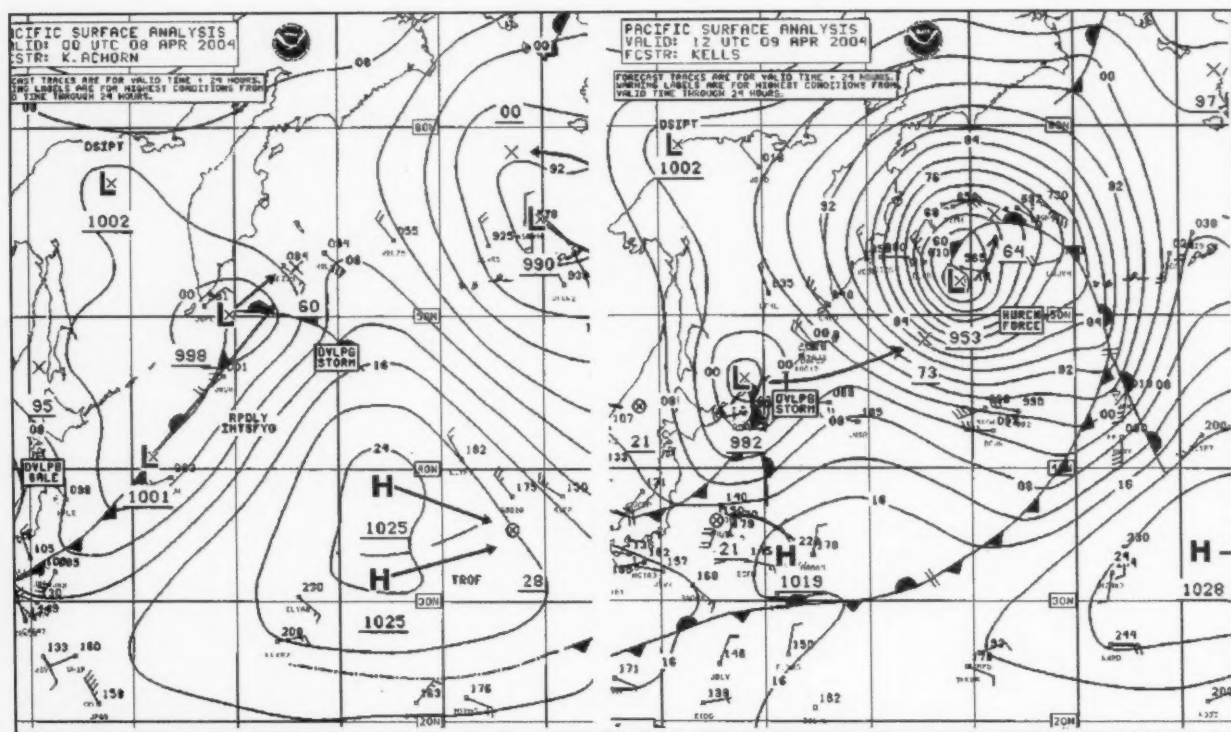


Figure 13. OPC North Pacific Surface Analysis charts (Part 2) valid 0000 UTC April 8 and 1200 UTC April 9, 2004.

**Northwest Pacific and Bering Sea Storm of April 8–11:** There was one hurricane-force storm in April, a rapid developer forming from the merger of two lows on a southwest-to-northeast frontal zone as shown in *Figure 13*. The central pressure dropped 39 hPa in the twenty-four hour period ending at 0000 UTC April 9, the same as in the February 15–17 storm in the eastern North Pacific. The storm became the second deepest of the period, attaining a 952 hPa central pressure near 53N 173E at 1800 UTC on the 9th. QuikSCAT remotely-sensed winds available at the time showed

winds to 65 kt west and southwest of the center (not shown). The **Westwood Borg** (LAON4) encountered southeast winds of 45 kt and 10.5 m seas (34 ft) near 56N 177E at 1200 UTC April 9. Six hours later, the ship **Hansa Visby** (ELWR5) near 53N 164E reported northwest winds of 40 kt and 14.5 m seas (47 ft). Later, the **Polar Eagle** (ELPT3) near 47N 159E reported west winds of 50 kt at 0600 UTC April 11. The system stalled in the southwest Bering Sea by then and began to weaken. *Figure 1* (first part) shows its remnant low dissipating there early on the 15th.

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Bancroft, G. and Sienkiewicz, J., High Seas Text Bulletins Issued by MPC (Mariners Weather Log, Summer 1996). ↓



## Tropical Atlantic and Tropical East Pacific Areas January to April 2004

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### How accurate are TPC's "Possible" Tropical Cyclone Forecasts?

Hurricane specialists at the Tropical Prediction Center (TPC)/National Hurricane Center (NHC) routinely issue the Atlantic and Eastern Pacific Tropical Weather Outlooks (TWO) (National Weather Service, 2002). The TWO describes areas of disturbed weather and the potential for tropical cyclone (TC) development in each basin within the next 48 hours. In 2001, the Tropical Analysis and

Forecast Branch (TAFB) of the TPC began issuing TC genesis forecasts in graphical and textual marine forecasts. These forecasts are intended to provide additional lead time to mariners in order to help them avoid the hazards posed by TCs.

Beginning in 2002, the TC genesis forecasts were included on TAFB's Tropical Cyclone Danger Graphic (TCDG) (*Figure 1*). The TCDG is available on marine radiofax and the NHC internet homepage ([www.nhc.noaa.gov](http://www.nhc.noaa.gov)). This

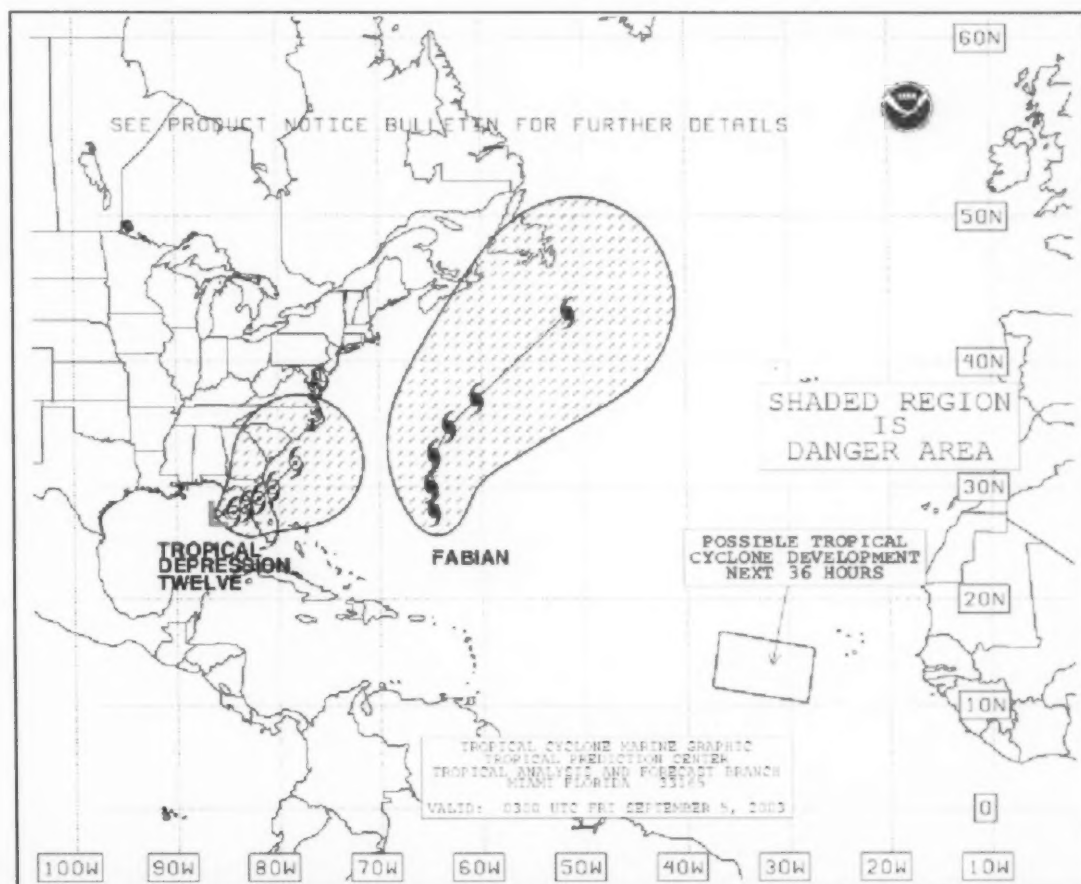


Figure 1. Example of a Tropical Cyclone Danger Graphic. Note, the area of "possible" tropical cyclone development in the eastern Atlantic. This weather system developed into Tropical Storm Isabel 34 hours after the issuance of this TCDG. A few days later, Isabel became a Category 5 hurricane over the tropical Atlantic.



graphic depicts areas of possible danger surrounding tropical cyclones by adding 100, 200, and 300 nmi plus the 34-kt wind radii to the 24, 48, and 72 hour NHC forecast positions. This is commonly referred to by mariners as the "1-2-3 Rule" (Holweg, 2000).

To determine areas of TC genesis, forecasters in TAFB routinely collaborate with the NHC duty hurricane specialist. TAFB forecasters and the hurricane specialist use several tools to help determine the potential for development. Forecasters use satellite intensity estimates to determine the organization of the system and will use numerical model forecast to help ascertain the likelihood of future development. When a weather system is determined to be a candidate for development within 36 hours, an area of possible development is then depicted graphically on the TCDG. The region depicted typically encompasses a horizontal area of about 300,000 km<sup>2</sup>.

The TC genesis forecasts from the TCDG were verified based on the development of a tropical cyclone (tropical depression or greater) (Brown et al., 2004). The probability of detection (POD), false alarm rate (FAR) and average lead time were computed. The POD is defined as the percentage of TCs that were correctly forecast to develop. The FAR is defined as the percentage of incorrect TC genesis events out of the total number of events forecast. The average lead time is defined as the time between the first possible TC forecast and the time of the first NHC forecast/advisory.

The POD for the Atlantic Basin was 79% in 2002 and 83% in 2003 (*Table 1*). The FAR for the Atlantic Basin was 32% in 2002 and remained at 32% in 2003. Therefore, in about one-third of the cases in which genesis was forecast, the weather system in question did not develop. The average lead time in the Atlantic Basin increased from 14 hrs in 2002 to 28 hrs in 2003.

<b>Atlantic</b>	<b>2002</b>	<b>2003</b>
<b>Probability of Detection (POD)</b>	<b>79%</b> <b>(11/14)</b>	<b>83%</b> <b>(15/18)</b>
<b>False Alarm Rate (FAR)</b>	<b>32%</b> <b>(6/19)</b>	<b>32%</b> <b>(7/22)</b>
<b>Avg. Lead Time</b>	<b>14 hrs</b>	<b>28 hrs</b>

**Table 1.** Atlantic Basin results of TC genesis forecasts during the 2002-03 tropical seasons. Note, the 2003 forecasts do not include forecasts for Tropical Storms Ana, Odettee, and Peter, since they developed outside of the hurricane season.

The POD for the Eastern Pacific Basin is better than for the Atlantic (*Table 2*). In 2002, 94% of the tropical cyclones that formed in the Eastern Pacific were detected early. In 2003, 100% were detected early. The FAR for the eastern Pacific was 21% in 2002 and increased to 43% in 2003. The average East Pacific lead time was 34 hrs in 2002 and 27 hrs in 2003.

<b>East Pacific</b>	<b>2002</b>	<b>2003</b>
<b>Probability of Detection (POD)</b>	<b>94%</b> <b>(15/16)</b>	<b>100%</b> <b>(16/16)</b>
<b>False Alarm Rate (FAR)</b>	<b>21%</b> <b>(4/19)</b>	<b>43%</b> <b>(12/28)</b>
<b>Avg. Lead Time</b>	<b>34 hrs</b>	<b>27 hrs</b>

**Table 2.** East Pacific Basin results of TC genesis forecasts during the 2002-03 tropical seasons.

Combining the results for both basins for both years provides a good overall indication of accuracy of these forecasts. The combined POD is 89% (57/64), the FAR is 33% (29/88), and the average lead time is 26 hrs (a lead time of 0 hr was assigned to the 7 undetected cases). For mariners using these forecasts, the combined results conclude that in about 9 out of 10 cases TC genesis was correctly forecast with an average lead time of slightly more than 24 hrs. In about a third of the cases the system in question did not develop.

These results indicate that TPC's TC genesis forecasts can provide increased lead times for mariners in most cases. The forecasts are being provided with a low number of false alarms. With improvements in numerical model forecasts it is believed that more accurate forecasts can be produced in the future.

## Changes to the Atlantic and East Pacific Tropical Weather Discussions

At 1605 UTC (12:05 pm EDT) on Tuesday, July 6, 2004, the Tropical Analysis and Forecast Branch (TAFB) of the National Hurricane Center/Tropical Prediction Center (NHC/TPC) will modify the format of the Atlantic and East Pacific Tropical Weather Discussions. Both products will become more user-friendly, with improvements in the discussion content and layout. A National Weather Service product survey was conducted on the proposed changes between January and April, and the user responses have largely applauded these modifications.

The current version of the Atlantic Tropical Weather Discussion (MIATWDAT) is divided into five sections that



address specific features within separate levels of the atmosphere over the tropical and subtropical area. The new version of the TWDAT aims to simplify this disconnection of weather features at several atmospheric layers and combine the features into a more complete and comprehensive manner. The new format will only contain four sections—special features, tropical waves, ITCZ, and discussion. Unlike the older format, the special features and tropical waves sections will only be included in the discussion when these features actually exist in the Atlantic basin. However, the ITCZ and discussion sections will be included year-round. The core of the TWDAT changes lies within the purpose of the discussion section. Essentially, this section now incorporates all features from the “middle/upper level features,” “surface synoptic features,” and “significant clouds/convection” sections in the current version to form a coherent discussion in which features from all layers of the atmosphere and associated convection are included. Also, the discussion will be divided into several geographical regions according to the current weather pattern. These regions may include—but are not limited to—Gulf of Mexico, Caribbean, West Atlantic, Central Atlantic, East Atlantic, Subtropical Atlantic, and Tropical Atlantic.

The East Pacific Tropical Weather Discussion (MIATWDEP) will be modified in a similar fashion to the changes to the TWDAT. The TWDEP will include the same four headings as the new Atlantic discussion and will abide by the same rules for including certain sections. This is a major deviation from the current version since middle and upper level features are not currently included in the product. The TWDEP will also contain regional sections according to the weather pattern (i.e. East of 110 W, West of 125 W, Mexican Coast, and Central American Coast).

### Significant Weather of the Period

#### Atlantic, Caribbean and Gulf of Mexico:

A total of 13 gale events occurred over the tropical and subtropical Atlantic, Caribbean and Gulf of Mexico from January through May 2004 (*Table 3*).

The majority of the gale events were associated with either low pressure centers or strong cold fronts that moved southeast across the Gulf of Mexico and western Atlantic. These gale events generally lasted about 24 to 48 hours.

Two somewhat unusual gale events occurred during the period across the southern Caribbean Sea along the coast of Colombia. These events were produced when strong high pressure built over the western Atlantic and lower pressures remained over Colombia. The first of the southern Caribbean gale event of the period occurred from the 1st to the 4th of January. On the 1st, two ships, the **Gen. Hoyt S. Vandenberg** (call sign NBBP) and the **Comoros Stream** (PBBW) both observed 35 kt winds just north of the Colombian Coast. On the 2nd and 3rd several ships, including the **Star Dover** (LAEP4), **Timmar III** (H3QA), **Polar Uruguay** (ELTH2), and **Duncan Island** (C6JS) observed 35 to 40 kt winds in the southern Caribbean. It is fairly common for ships to encounter strong winds in the southern Caribbean. However, it is unusual that so many ship observations of gale force winds were received during this event. The second southern Caribbean gale event occurred between the 2nd and 6th of March. During this event the **South Hampton Star** (3FWT9) and the **P&O**

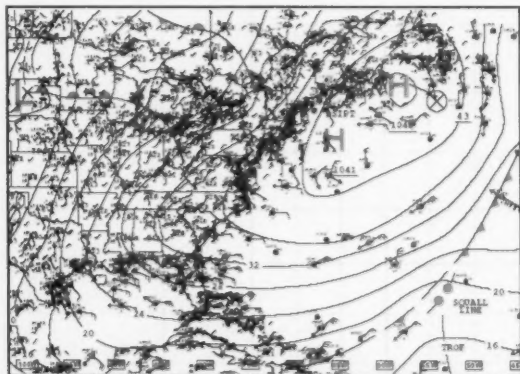
Gales Events in the Tropical Atlantic, Caribbean and Gulf of Mexico January Through May 2004			
Event	Area	Beginning	Ending
1	S. Caribbean Gale Area	1200 UTC 1 January	1800 UTC 4 January
2	Atlantic Cold Front	1800 UTC 15 January	0000 UTC 19 January
3	W. Atlantic Cold Front	1800 UTC 18 January	0600 UTC 20 January
4	Central Atlc. Cold Front	1200 UTC 1 February	0000 UTC 2 February
5	W. Atlantic Cold Front	0600 UTC 19 February	1800 UTC 19 February
6	W. Atlantic Cold Front	0000 UTC 26 February	1200 UTC 26 February
7	W. Atlantic Low	0600 UTC 28 February	1200 UTC 29 February
8	S. Caribbean Gale Area	0000 UTC 2 March	1200 UTC 6 March
9	W. Atlantic Cold Front	1200 UTC 10 March	1200 UTC 11 March
10	Strong W. Atlantic High Pressure	0000 UTC 25 March	1800 UTC 26 March
11	E. Atlantic Low	1200 UTC 1 April	1800 UTC 2 April
12	Central Atlantic Low	1800 UTC 11 April	1800 UTC 14 April
13	SW Gulf of Mexico Cold Front	1200 UTC 2 May	1200 UTC 3 May

Table 3. Estimated beginning and ending times of gale events in the tropical Atlantic, Caribbean, and Gulf of Mexico from January to May 2004.



**Nedlloyd Houston** (PGE) reported gale force winds in the southern Caribbean.

In late March, a high pressure center strengthened off the northeastern United States coast. This high produced strong northeast winds over the southwestern north Atlantic for several days. This included a period of gale force winds on the 24-26 March. Late on the 24th, a 15-17 mb pressure gradient was noted between 32°N and the coast of eastern Cuba. This gradient produced gale force winds from the central and southern Bahamas northeastward to southeast of Bermuda. Several ships in the area including the **Explorer of the Seas** (ELWX5), **Green Lake** (WDDI), and V2JZ (name unknown) reported 35 to 40 kt winds between the Bahamas and 65°W at 0000 UTC 25 March. At 1200 UTC the high was centered just off the coast of Nova Scotia (**Figure 2**). At this time the high had strengthened to 1045 mb and it continued to produce gale force winds well to its south. Because of the long duration and fetch of the strong winds, seas built to 4 to 5.5 m (14 to 18 ft) east of the Bahamas. Late on the 26th, the high began to weaken as it moved east-northeastward across the north Atlantic. At this time the winds decreased below gale force.



**Figure 2.** TPC Surface Analysis at 1200 UTC 25 March, 2004. Note the strong 1045 hPa high off the coast of Nova Scotia. This high produced an area of gale force winds over the southwest North Atlantic.

An unusually late season cold front produced gale force winds over the southwest Gulf of Mexico on the 2nd and 3rd of May. During this event, strong high pressure built southward behind the front over northern Mexico.

QuikSCAT detected the presence of gale force winds along the coast of Mexico and the southwest Bay of Campeche. The event lasted about 24 hours and ended at 1200 UTC 3 May. This high event also produced a late-season gale event in the Gulf of Tehuantepec.

### Eastern North Pacific

The 2003-2004 Gulf of Tehuantepec gale season was rather active with a total of 25 gale events between early November and early May. Fourteen of these events occurred between January 1st and May 5th. Storm force winds occurred during two of these events. **Table 4** is a list of the estimated beginning and ending times of Gulf of Tehuantepec gale and storm events between January and May 2004. These events were verified by either a reliable ship observation or QuikSCAT data. The majority of the events lasted about 24 to 48 hours while two events continued for about 4 days.

One of the strongest events of the period began around 0600 UTC 10 January. At this time winds increased to gale force in the Gulf of Tehuantepec. Early on the 11th stronger high pressure began building southward over the southwestern Gulf of Mexico. This increased the winds to storm force by 0600 UTC in the Gulf of Tehuantepec. At this time the ship **Rotterdam Express** (DMRX) observed storm force winds near 14°N 96°W. Storm force winds continued for nearly 24 hours. Winds decreased to below gale force around 1800 UTC 13 January. Another storm force wind event occurred in mid-February. The event began as winds increased to gale force around 1800 UTC 16 February. Surface pressures increased to 1030 mb over the southwest Gulf of Mexico late on the 17th. At this time winds increased to storm force. An 0033 UTC 18 February QuikSCAT pass (**Figure 3**) measured 50 kt winds in the Gulf of Tehuantepec. The next QuikSCAT pass at 1136 UTC also reported 50 kt winds. Winds decreased below storm force late on the 18th and decreased below gale force at 1800 UTC 19 February.

Four late-season Gulf of Tehuantepec gale events occurred between mid-April and early May. The event that occurred in early May is the latest event that has been verified by QuikSCAT since 1999.



Gulf of Tehuantepec Gale and Storm Events January - May 2004		
Event	Beginning	Ending
1	0000 UTC 7 January	1800 UTC 8 January
2*	0600 UTC 10 January	1800 UTC 13 January
3	1800 UTC 19 January	1800 UTC 20 January
4	1800 UTC 27 January	0000 UTC 29 January
5	1800 UTC 3 February	0600 UTC 4 February
6	0600 UTC 7 February	0600 UTC 9 February
7*	1800 UTC 16 February	1800 UTC 19 February
8	1800 UTC 26 February	1200 UTC 28 February
9	1200 UTC 8 March	1200 UTC 12 March
10	0600 UTC 21 March	0000 UTC 25 March
11	1800 UTC 13 April	1800 UTC 15 April
12	1800 UTC 18 April	1800 UTC 19 April
13	0000 UTC 28 April	1200 UTC 28 April
14	0000 UTC 3 May	1200 UTC 5 May

Table 4. Estimated beginning and ending times for Gulf of Tehuantepec gale and storm events from January through May, 2004. Storm events are denoted with an asterisk (\*).

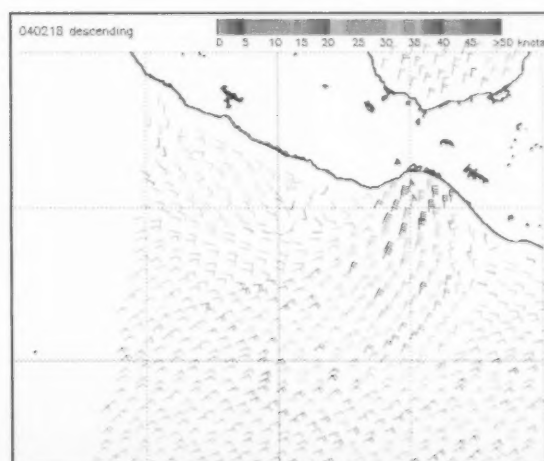


Figure 3. QuikSCAT data from 0033 UTC 18 February 2004.

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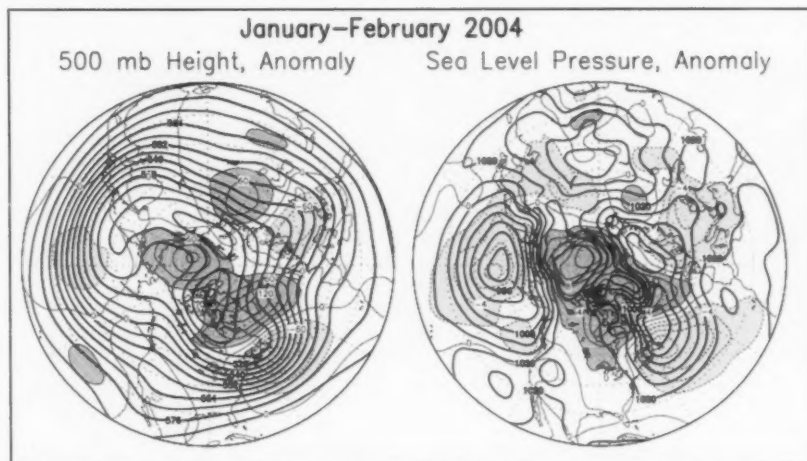
## MEAN CIRCULATION HIGHLIGHTS AND CLIMATE ANOMALIES

A. James Wagner, Senior Forecaster, Climate Operations Branch, Climate Prediction Center /NCEP/NWS/NOAA.

### January–April 2004

The circulation pattern over the Northern Hemisphere during January and February was characterized by strong high latitude blocking, as reflected in an extensive area of above normal 500 hPa height with positive anomaly centers located over southern Greenland and over the Arctic Ocean on the Siberian side of the Pole. At the surface this was manifested in high pressure of more than 8 hPa above normal centered over the Arctic Ocean under the mid-tropospheric anomaly, with a connecting area of higher than normal surface pressure extending southward from the Arctic to the Great Lakes area. Deeper than normal troughs aloft above strong mean low pressure areas at the surface were located over the middle latitudes of the central Pacific and over the western Atlantic just to the south of the Canadian Maritimes. A relatively intense mid-tropospheric trough and lower than normal surface pressure were also located over eastern Europe and western Russia. This type of pattern is described as having strongly negative phases of both the Arctic Oscillation (AO) and North Atlantic Oscillation (NAO).

As is typical when this type of pattern occurs during the winter, there were extensive areas of below normal temperature over the northeastern United States and Europe, with cyclonic activity concentrated mainly in the areas of below normal SLP over the central Pacific and the western Atlantic. The Atlantic cyclonic center



was strongest in January and the Pacific one was the most intense in February. The abnormally cold weather was especially noteworthy over New England during January, continuing a pronounced cold spell that began during December. The mildest weather relative to normal was located over the southern Great Plains in January, as hinted by the slightly enhanced southerly component in the anomalous geostrophic wind implied by the 500 hPa height anomaly field, although in February the coldest conditions relative to normal were found across the southern tier of states from southern California to Georgia and the Carolinas. Temperatures averaged slightly above normal across the northern border states from Washington to Minnesota during February, while a strong reversal in temperature anomalies occurred over Alaska, going from well below normal during January to as much as 10F above normal in the eastern interior of the state during February.

Offshore anomalous surface flow over much of the Atlantic Seaboard was associated with relatively dry conditions in both January and February, with a general lack of heavy snowstorms in spite of the cold weather. The Florida Peninsula and the southern Plains had heavier than normal precipitation totals in both months, as would appear reasonable in the light of the stronger than normal southerly component in the 500hPa flow over the southwestern part of the country, and a somewhat enhanced subtropical jet stream in February. However, the wet weather in Florida appears to have been primarily related to frequent showers in the return flow of Arctic air flowing southward off the Atlantic Coast and becoming unstable after being moistened and heated over the relatively warm waters of the Gulf Stream. During February, when the trough over the West was strongest, most locations both along the Pacific Coast and in the interior Southwest reported above average precipitation.



## March–April 2004

During March and April, both the Canadian and Siberian lobes of the polar vortex became somewhat stronger than normal, although blocking continued over much of the Arctic Basin, Barents Sea and northeastern Atlantic. Both the Bermuda High and the eastern Pacific ridge became stronger than normal, and with Arctic air confined to higher latitudes, temperatures averaged well above normal over most of the United States during March, with a reversion to slightly below normal in the Gulf coast area from Texas to Florida during April. During March, when the eastern Pacific ridge was at its strongest and extended into the West, many record high temperatures for the month and for so early in the season were set over the Southwest, accompanied by very dry weather that caused an unusually rapid melting of the snowpack in the mountains and an early outbreak of wildfires.

Significant storms during March were confined mostly to the middle of the United States where the moisture brought welcome relief to some areas with incipient drought conditions. In April, precipitation became more widespread over the Southwest and

the Northeast, after both areas were unusually dry in March. Most of the Midwest became drier than normal during April. The variations in the climate during March and April were not all obvious from the map that averaged the two months, due to considerable variability during this period.

## The Tropics

The first four months of 2004 featured a continuation of neutral ENSO conditions, with equatorial SSTs slightly below normal over the eastern Pacific and more noticeably above normal near and just west of the Dateline. Atmospheric indices that measure the status of ENSO averaged close to normal values. As is often the case with a near neutral ENSO, the Madden-Julian Oscillation (MJO) was fairly active over the eastern Indian and western Pacific Oceans. The MJO waves did not propagate strongly east of the Dateline due to the cooler than normal SSTs that were unable to support active convection. However, it is believed that MJO activity did modulate the circulation over the Pacific during much of the winter, contributing to reversals in the phase of the Pacific / North American Pattern (PNA) that caused significant intra-seasonal variations in temperature and

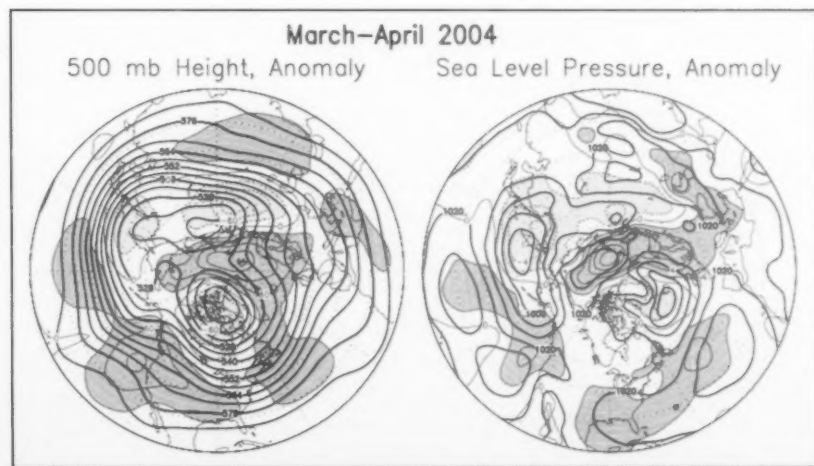
precipitation over the United States. The overall perception was that the climate was somewhat more variable than usual during the first four months of 2004.

There is good evidence that the first hurricane ever recorded in the South Atlantic Ocean occurred during March. Satellite visible imagery showed a well-defined eye, and wind gusts of up to 90 mph were observed near the location of landfall. The storm was named Catarina, after the Brazilian province where it made landfall.

## Figure legends and description of units:

The charts on the left show the seasonal mean 500 hPa height contours at 60 m intervals in heavy solid lines, with alternate contours labeled in decameters (dm). Positive height anomalies are contoured in light solid lines at 30 m intervals, and negative height anomalies are shown by light dashed lines. Areas of mean height anomalies greater than 30 m above normal have heavy shading, and areas of mean height anomalies of more than 30 m below normal have light shading.

The charts on the right show the seasonal mean sea level pressure (SLP) at 4 hPa intervals in heavy solid lines, labeled in hPa at selected intervals. Anomalies of SLP are contoured in light lines at 2 hPa intervals, with dark shading and solid lines in areas more than 2 hPa above normal, and light shading with dashed lines in areas greater than 2 hPa below normal. ↓





## Familiarization Float: *M.V. North Star*

Jeff Lorens, Program Manager, Marine and Coordination Services,  
National Weather Service, Western Region Headquarters

I was invited aboard the **M.V. North Star**, owned and operated by Totem Ocean Trailer Express (TOTE), Inc., for a familiarization trip ("fam float") March 24–31, 2004. The trip would take me from Tacoma, Washington to Anchorage, Alaska, and back again. My main goals were to see first-hand how weather affects the ship's operations, and to better understand how weather observations are taken at sea and transmitted to the National Weather Service (NWS).

The **North Star** is a large "roll-on/roll-off" cargo vessel (*Figure 1*)—839 feet in length with a beam width of 118 feet. She is one of two "Orca" class vessels built by National Steel and Shipbuilding Company in San Diego, California. Her sister ship is the **M.V. Midnight Sun**. Both ships are relatively new. The **Midnight Sun** was christened in August, 2002; the **North Star** followed in June of 2003. Each ship can carry up to 600 full-size truck trailers and 200 cars. She can also carry other types of large wheeled vehicles, such as

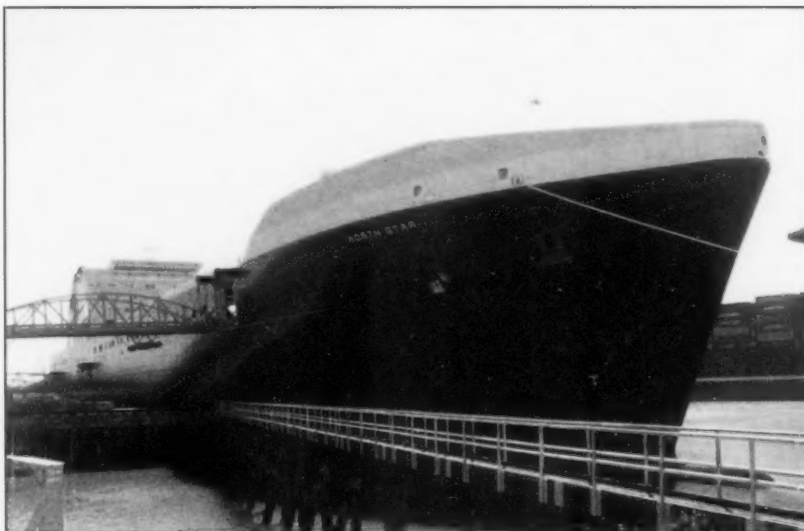


Figure 1. *M.V. North Star* at Tacoma, Washington.

buses or tractors. There are 6 cargo decks forward (5 for trailers and 1 for cars) and 5 decks aft (3 trailer decks and 2 for cars.) Loading/unloading is accomplished by driving on and off over three large,

moveable ramps connecting the ship to the dock, and moving up and down within the ship using a series of internal ramps between decks. The "roll-on/off" system allows for rapid loading and unloading—the entire process typically takes no more than about nine hours.

### Wednesday, March 24th

I boarded the **North Star** early Wednesday afternoon, March 24th. Unloading of the ship's cargo began later in the afternoon, around 5 pm. The loading operations started later, around 9 pm, even as the unloading process continued. For a new observer, such as myself, the loading/unloading process appeared chaotic at times but skillfully orchestrated and accomplished. Within a few hours of tying up at TOTE's Tacoma facility, trucks began moving onto the ship and pulling trailers off. Maneuvering space for these trucks was extremely tight, especially early in the process. The trailers were parked side-by-side and end-to-end on every cargo deck. In many areas, there was only a foot or less between parked trailers (*Figure 2*.)



Figure 2. *M.V. North Star* loading operations prior to getting underway.



Figure 3. *M.V. North Star* heading west through the Strait of San Juan de Fuca.

As unloading continued, the available space increased, but the trucks still had to make seemingly impossible turns on deck and in going up and down the ship's internal ramps. There were often three or four trucks simultaneously moving on deck, sometimes moving in opposite directions within inches of one another. On this day, a steady rain made for very slick upper decks. During the unloading process, some trucks occasionally needed a little push (from another truck) in order to get into just the right position to latch with its trailer, or to get the trailer moving once latched.

For loading, trailers were pulled quickly aboard, parked and released, and then the drivers went back for another. Separate crews went from one trailer to the next, chaining each to the deck to prevent movement while at sea. Interspersed with the trucks moving on and off the ship, cars also moved aboard and were secured on the lowest cargo decks. Needless to say, the cargo decks during loading and unloading are a highly dangerous place for an untrained observer. I wisely chose to watch the entire process from above.

#### Thursday, March 25th

The ship was due to sail about 1:30 am Thursday morning, but our departure was delayed a few hours. At about 6:30 am, the pilot came aboard and we got underway. Our trip north from Tacoma through Puget Sound was calm and uneventful. As

we turned west into the Strait of San Juan de Fuca (around noon), the winds strengthened and we also started to pick up a slight swell coming in from the Pacific. We slowed near Port Angeles, Washington to disembark the pilot, then continued westward to sea. As we neared the western entrance to the Strait of San Juan de Fuca, the swell continued to build to around 20 feet, and we occasionally took some spray over the bow. Exiting the straight into the Pacific Ocean, we turned northwest and paralleled the coast of Vancouver Island through the night, occasionally passing through rain showers and sleet. The ship's roll increased (typically 10–15 degrees), but the strongest winds and largest seas remained south of us, in association with a strong low off the coast of Washington and Oregon. As the *North Star* continued northwest, winds and seas steadily abated, decreasing the ship's pitching and rolling, and making for a very restful first night's sleep.

#### Friday, March 26th

I awoke the next morning to find us west of the Queen Charlotte Islands, off the coast of British Columbia. It was still mostly cloudy, but there were breaks in



Figure 4. Bridge on the *M.V. North Star*.



Figure 5. Weather table on the *North Star's* bridge.

the clouds allowing the morning sun to shine through. Visibility was very good, and I could clearly see the mountains about 30 miles to the east. By now, the swell had subsided to around 10 feet or less, mainly from the south. As we moved into an area of weak high pressure, winds fell to about 5–10 knots, and were even near calm for a few hours. Temperatures hovered in the mid 40s—unusually calm and pleasant conditions for late March in the north Pacific. We continued northwest, moving further away from the coast through the day.

### Saturday, March 27th

The next morning, we were heading west-northwest across the northern Gulf of Alaska toward Cook Inlet, slowing to about 18 knots to conserve fuel. The weather worsened overnight and seas turned rougher as southwest winds increased to 25–30 knots. Temperatures had dropped to the mid 30s. Early in the morning, the visibility dropped to near zero at times as we passed through scattered snow showers. The *M.V. North Star's* Captain (Jack Hearn) had earlier selected a more northerly route (slightly

less direct) across the Gulf of Alaska toward Kennedy Entrance (passage between the Barren Islands and the western tip of the Kenai Peninsula), which we would pass through heading toward Cook Inlet. His experience indicated that this type of routing (mainly during winter) typically has somewhat more favorable

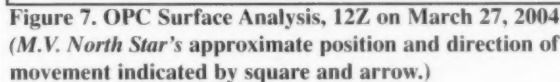
sea conditions. The choice of the precise route on any particular trip depends on several factors, including fuel consumption, schedule, and of course, crew safety.

The forecast indicated that weather conditions would continue to worsen over the next 24–36 hours, with a low to our south moving quickly north and strengthening to storm force as it neared the south coast of Alaska (Figure 7.) By that time, however, we would be in Anchorage, allowing the worst of the storm to pass by before departing for the return trip Sunday night.

During the afternoon, I spent time with the Second Mate, Karl Carr as he made a weather observation. These observations are critical for preparing surface analyses and as input data for initializing numerical weather models. He carefully observed the wave conditions, and from that, he then estimated the surface wind (using the well-known Beaufort Scale.) He also compared this with the measured wind from the ship's anemometer (taking into account the ship's motion), but since it is located on top of the bridge, more than 130 feet above the water, it can easily vary from the true surface wind. He also observed the temperature (dry and



Figure 6. Rough seas as *M.V. North Star* heads north across the Pacific toward Alaska.



By late afternoon, our winds had slackened considerably. Seas were much smoother for the rest of the day, but snow showers persisted. We passed through Kennedy Entrance about 7:30 that evening and continued up Cook Inlet overnight.



Figure 9. *M.V. North Star* tied up at Anchorage Alaska.

### Sunday, March 28th

We tied up at TOTE's Anchorage facility about 6:30 Sunday morning. The ramps were quickly raised into place and the unloading/loading process began again. The weather was cloudy and cold, with a moderate north wind and temperatures hovering around 20 degrees (see *Figure 10* for surface analysis.) Despite the cold, I took the opportunity to get off the ship and venture into Anchorage for a few hours.

Upon returning to the ship later in the afternoon, loading was nearly complete. There were fewer trailers and no cars aboard this time. Most of the trailers were empty, meaning the ship would be lighter for the return trip—somewhat more prone to pitching and rolling. We again were underway about 7 pm that evening, and the trip back down Cook Inlet was a smooth one for the most part.

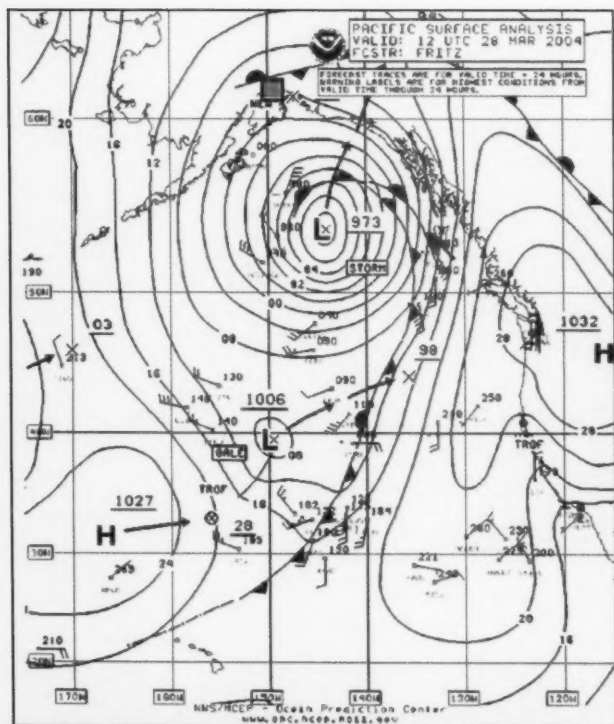


Figure 10. OPC Surface Analysis, 12Z on March 28, 2004 (*M.V. North Star* was nearing anchorage at this time.)



Figure 11. *M.V. North Star* loading operations at Anchorage, Alaska.

## Monday, March 29th

We crossed back into the Gulf of Alaska about 4 am on Monday and turned east-southeast. By being in port the previous day, we avoided some strong winds and rough seas associated with a deep surface low, which had moved north-northeast across the Gulf and moved inland to the east of us. During the morning, our winds were from the west to northwest, but as we continued on our track, the wind shifted to the southwest and increased to around 30 knots, while seas increased to around 12 feet. The deep surface low in the northeastern Gulf of Alaska had quickly moved inland, but at the same time, another low dropped south and moved off the southern coast (**Figure 13.**) A strong surface pressure gradient behind the low gave us some strong following winds as we moved south out of Cook Inlet and into the Gulf. As expected, the ship's motion increased due to higher waves, but it was not as bad as it would have been had we been going into the wind and waves. During the afternoon, however, the wind and seas decreased as



Figure 12. Sunset over Cook Inlet as the *North Star* heads back out to sea.

the low moved northeast and the pressure gradient eased.

Later that day, the *North Star's* Chief Engineer Harry Poole gave me a tour of the engine room and other engineering spaces on the *North Star*. I was impressed with the complex interaction of systems—propulsion, electrical, and “plumbing” systems, and the technology used to monitor and control it all.

## Tuesday, March 30th

By Tuesday morning, we were once again off the Queen Charlotte Islands, heading southeast parallel to the British Columbia coast. Our weather was good, except for occasional showers. A cold front had earlier pushed inland and we were now moving into a ridge of high pressure behind the front. The forecast for our last full day at sea also looked good. Another frontal system to the west was moving toward the Pacific Northwest, but it was expected that it would stay mostly north of us as we entered the Strait of San Juan de Fuca the following morning.

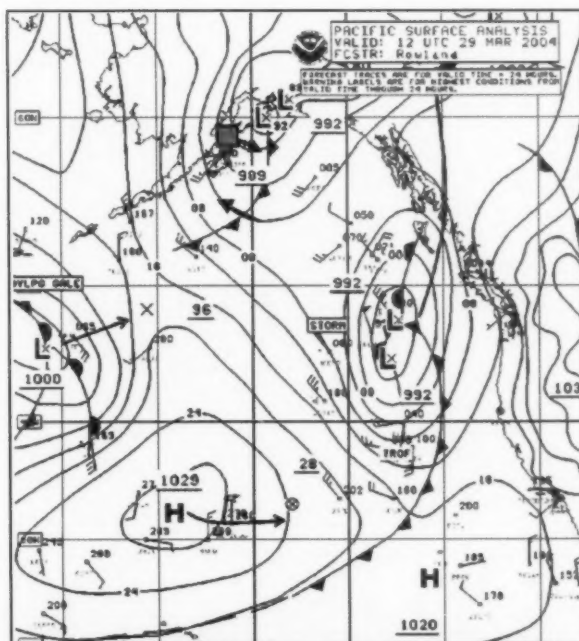


Figure 13. OPSC Surface Analysis, 12Z on March 29, 2004 (*M.V. North Star's* approximate position and direction of movement indicated by square and arrow.)



### Wednesday, March 31st

We entered the Strait of San Juan de Fuca just before sunrise. Although mostly cloudy (from the approaching frontal system), winds were light and the waters were nearly calm at times. We again picked up the pilot near Port Angeles, then continued into Puget Sound and south to Tacoma. We tied up at the TOTE dock at about 1 pm. Although my journey was done, the crew quickly made preparations to turn around and repeat the trip once again.

Although the weather on this particular trip certainly could have been a lot rougher, I nevertheless gained a better understanding of the critical role weather

plays in operations and route planning for large cargo ships, such as the **M.V. North Star**. Captain Hearn indicated that the weather information provided by NWS plays a major part in his decision-making, both at sea, and in port getting ready for sea. Using weather data provided by NWS, the ship can often be routed to avoid the worst of the weather conditions. Although large course deviations are usually not possible, even slight course and speed adjustments can result in considerable fuel savings and enhanced crew safety. I truly hope to be able to have the chance to do this again in the future, but maybe next time my weather won't be as smooth!

### Acknowledgements

I wish to thank the officers and crew of the M.V. North Star for making my trip such an enjoyable one. In particular, I'd like to thank Captain Jack Hearn for welcoming me aboard and taking the time to tell me about the ship's operations, and how he dealt with the weather and seas. I also wish to thank Teresa Velasco, Terminal Analyst with TOTE, Inc., who arranged this trip for me and welcomed me so kindly. Finally, thanks also go to Pat Brandow, NWS Port Meteorological Officer in Seattle, WA, who initially facilitated the trip, and then made several follow-ups with TOTE, Inc. throughout the process.



Figure 14. Rough seas as *M.V. North Star* heads back toward Tacoma across northern Gulf of Alaska.



## New Orleans New Port Meteorological Officer (PMO)

*Paul S. Trotter, Meteorologist in Charge, Weather Forecast Office New Orleans*

*Robert A. Luke, VOS Program Lead*

**F**inding a replacement for Mr. John (Jack) Warrelmann was not an easy task. However, out of 25 candidates, it gives me great pleasure to announce the acceptance of Ms. Paula Marie Campbell to fill the position of New Orleans PMO.

Hailing from near the Francis Scott Key Bridge in Baltimore, Maryland, she avidly pursues drawing and water painting. Ms. Campbell has always had a love of water. Her love for water began a career in the United States Navy.

Ms. Campbell has been working in weather for 23 years. She worked six years in the Navy. Several of those years were as an Aerographer Mate in radar surveillance integrating radar, satellite, oceanographic, and meteorological data into missionary concerns in Bermuda. She then worked at the Lemoore Naval Air Station in California, supporting aircraft carrier flight crews, and assisting in climatic research.

After her assignment with the Navy, she signed on with NWS in San Francisco, California, as a Meteorological Technician. She then worked as a Network Weather Radar operator at WSMO Volens, Virginia. She continued her career with NWS by becoming a Hydrometeorological Technician at National Weather Service, Blacksburg, Virginia. Of late, she took a sabbatical and joined the Army Reserves in Greenville, South Carolina. She has taken many courses inclusive of Physical Science at Southern University of New York and

Political Science and Business Administration at the Colleges of the Coalingas and Sequoias in California.

She is well in tune with NWS, NOAA, and DOC's mission delivery as related to saving lives and property, safety and environmental issues, and boosting the nation's economy. She is anxious to get things rolling in her new position and looks forward to becoming an integral member of the PMO family.





## Alaska Region

### APRIL 2004

Alaska set a new all time record for the most BBXX received during any April with 2,106. Alaska vessels have transmitted 8,218 BBXX during the first 4 months of 2004 which is at a pace that is 68% higher compared to the first 4 months of our previous record year of 2003. The **Arctic Sun** was the Alaska Ship of the Month for April with 193 BBXX. They have 770 BBXX for 2004 which is 27 more BBXX than their sister ship the **Polar Eagle**. These 2 ships have made Marathon Oil Company, the top supporter of the Alaska VOS Program by supplying 18.4% of the total Alaska BBXX for 2004 so far.

### MAY 2004

Another record breaking month for BBXX observations received with 2,834! Alaska vessels have transmitted 11,050 BBXX during the first 5 months of 2004 which is at a pace that is 67% higher compared to the first 5 months of our previous record year of 2003. The **Polar Eagle** was the Alaska Ship of the Month for May with 191 BBXX. They are also in 1st place for 2004 with 934 BBXX which is 135% more than at this same point last year.

### JUNE 2004

The Tug **Pacific Challenger** won their 1st Alaska Ship of the Month title in June with an outstanding total of 190 BBXX. This Sea Coast Towing vessel moved into 3rd place in the Alaska 2004 rankings with 709 BBXX which is 683 more BBXX than at this same time last year. The **Polar Eagle** remained in 1st Place in the 2004 Alaska Rankings with a 6 month Alaska Record of 1,046 BBXX. This is 104% more BBXX than at this same time last year. Alaska ships transmitted 2,846 BBXX for the month of June 2004 to the bring the cumulative 2004 total to 14,158 BBXX. This is 60% more BBXX than the first 6 months of 2003 which was Alaska's previous record year. A big THANK YOU to all the Alaska participating ships!

### Alaska BBXX TOP 15, June 1-30, 2004

1. PACIFIC CHALLENGER - 190
2. SINUK - 161
3. SENECA - 121
4. ARCTIC SUN - 118
5. SEA PRINCE - 117
6. SEABULK MONTANA - 116
7. POLAR EAGLE - 112
8. NORTH STAR - 110
9. NAVIGATOR - 103
10. PARAGON - 97
11. SIOUX - 87
12. HORIZON KODIAK - 82
13. JAG PRAKASH - 82
14. OCEAN VICTORY - 75
15. POLAR RESOLUTION - 70

### Alaska BBXX Top 15 JAN 1 - JUN 30, 2004

1. POLAR EAGLE - 1,046
2. ARCTIC SUN - 977
3. PACIFIC CHALLENGER - 709
4. JAG PRAKASH - 584
5. SEABULK MONTANA - 558
6. HORIZON ANCHORAGE - 464
7. SINUK - 429
8. PARAGON - 425
9. HORIZON KODIAK - 406
10. NORTH STAR - 380
11. GUARDSMAN - 375
12. HORIZON TACOMA - 324
13. POLAR RESOLUTION - 306
14. MIDNIGHT SUN - 297
15. TUSTUMENA - 292



## VOS Program Awards

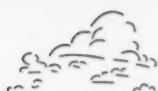


Chief Mate Michael Parr, on the right and Third Mate Bruce Forbush, on the left, accept 2003 VOS Performance Award from NY PMO Jim Luciani, in the center, April 9, 2003, on behalf of the Captain and Crew of *Horizon Hawaii*.

Second Mate Christian Omdal of the *Horizon Tacoma* received their 2003 VOS Award The vessel took 648 observations.



*Horizon Producer Master*, Don Cocozza, on the left, accepts an annual VOS Award from PMO Jim Luciani, on the right.



Second Mate Jay Thomas of the *Horizon Anchorage* received their 2003 VOS Award while at the Port of Anchorage on April 13, 2004. They took 843 observations in 2003.

Chief Mate Skip Santos, on the left, Captain David E. Cox, in the center, and Second Mate Donald G. Thomas, on the right from the *APL Singapore* were presented a 2001 VOS Award by Seattle PMO Pat Brandow (not pictured) for quality weather observations.



Captain Charles Parish of the *Seabulk Montana* received a 2003 VOS Award while anchored near the Port of Anchorage Alaska on June 10, 2004. This vessel provided 893 ship observations in 2003 which was over 40% more than their 2002 total.

Captain Parish also provides valuable ice observations in Cook inlet during the winter months. Through June 9th of 2004, the *Seabulk Montana* has already taken a total of 483 excellent weather observations.



Seattle PMO Pat Brandow (not pictured) gave top honors to Chief Officer Joachim Muthwill, on the left and Captain Heinz Kruger, on the right from the *Pusan Senator* and presented them with a 2001 VOS Award for high quality surface marine observations.

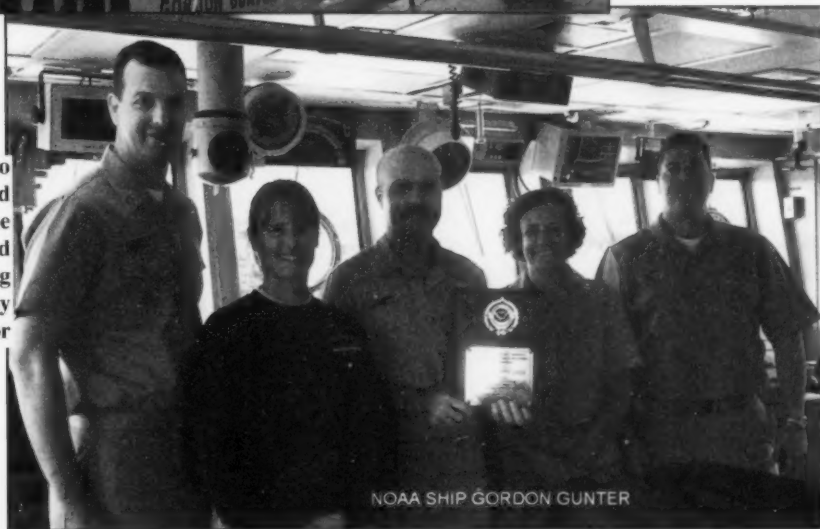


Pictured left to right is ENS Sean Cimilluca, ENS Andrew Hall, LTJG Thomas Peltzer, and PMO Jack Warrelmann presenting the NOAA Ship *Gordon Gunter* with a 2002 VOS Award.

*NOAA Ship Gordon Gunter*



The NOAA Ship *Gordon Gunter* also received a 2003 VOS Award. Pictured left to right receiving the award; the Executive Officer Lt Joe Pica, 3rd Mate Miri Skoriak, Commanding Officer, CDR Jon Rix, ENS Lindsay Kurelja, and ENS Johnathan Talor



## VOS Awards



A 2003 VOS Award was presented to the *M/V Liberty* by PMO James Saunders, on the right to Captain Darren McGowan, on the left and Eleanor McCluney, in the center.

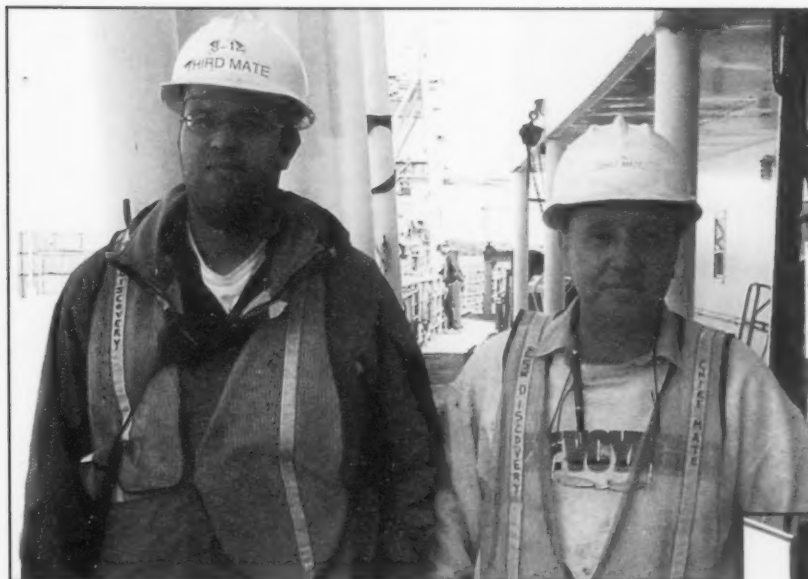
The *United Spirit* was one of the vessels recognized in 2001 by the VOS program for superior performance. Rich Douglas, Division Chief of Meteorological Services of Western Regional Headquarters on the left presents the VOS plaque to Third Officer Elmer S. Duran on the right.



Pictured left to right are Third Mate Natalie Benevant, Captain Don Isler, and Chief Mate Paul Savasak receiving a 2003 VOS Ship award for the *Horizon Challenger*.

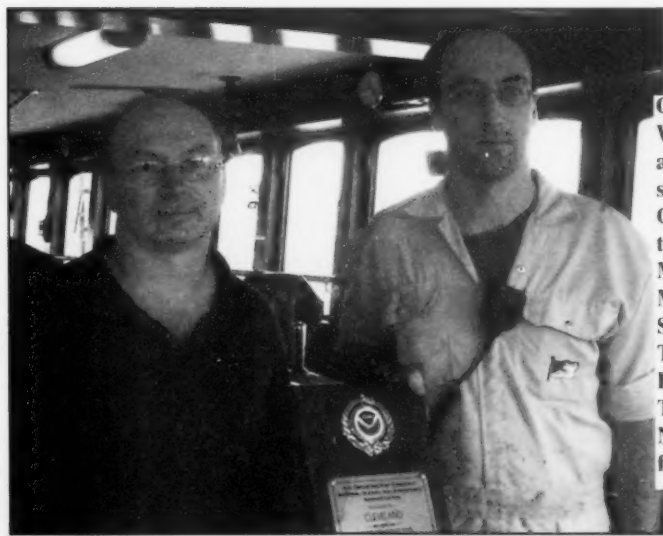


## VOS Awards



Third Mate Omar D'Abreu, on the left and Chief Mate Patrick O'Leary, on the right, received a 2003 VOS Ship Award for the *Horizon Discovery*.

A VOS Award was presented to Captain Saturnino of the *M/V Isla De Cedros*. The Weather Observation Team is pictured left to right, Carlos Rico, Drew Pawley, (Environment Canada), Captain Elmer Saturnino, and Leonardo Quiobe. Ernesto Camposanto is not pictured but also served as a weather observer in contributing to the overall success of this vessels program.



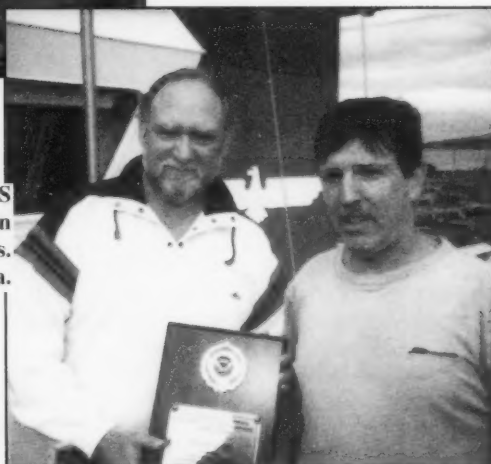
Captain Jack McAuliffe and Second Mate Jim Warburton, from the vessel *Cleveland*, are presented with a 2003 VOS plaque for providing over 450 high quality surface weather observations, mainly in data sparse areas. Other officers who sailed last year and greatly contributed were Captain David Sanchez-Navarro, Chief Mate Patrick Cunningham, Chief Mate Bob Reilly, Chief Mate Charles McDermott, Second Mate Charles Azar, Second Mate Christopher Zola, Second Mate Michael Tolley, Third Mate Lori Frandino, Third Mate Cesar Poninski, Third Mate Michael Camp and Third Mate Thomas Martino. The National Weather Service and NOAA extends their thanks to both Masters and Mates for their outstanding support.

## VOS Awards

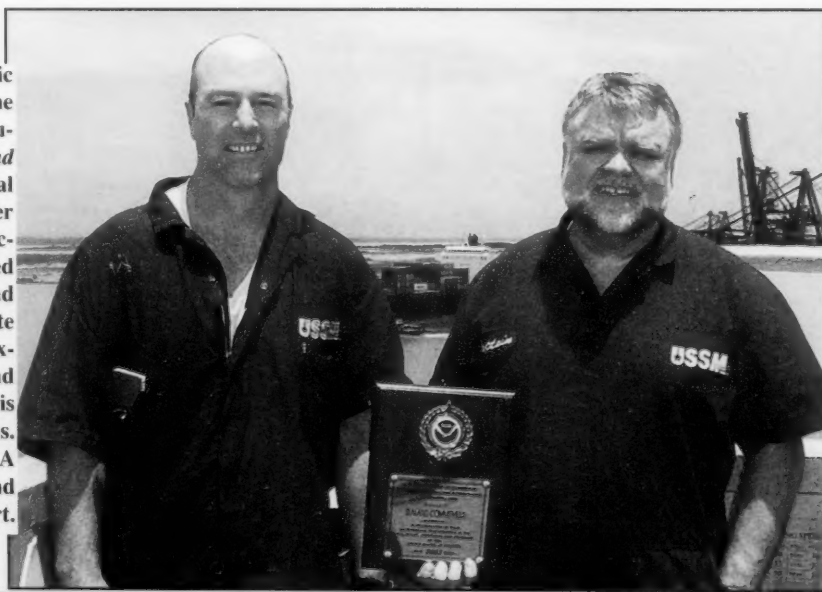


Chris Fakes, PMO Houston/Galveston, on the right, is shown giving an award to Chief Mate Mary Beth O'Brien, on the left, of the *Lykes Discoverer*. The *Lykes Discoverer* provided the National Weather Service with over 1200 observations in 2003. This the fifth year in a row the *Lykes Discoverer* has received the annual VOS award. Although not pictured, the following have contributed a lot of effort in providing quality and timely marine observations; Captain Scott Putty, Captain Billy Miles and Chief Mate Hal Held. The National Weather Service and NOAA extend their thanks to both Masters and Mates for their continued support.

The *President Adams* was presented a VOS Award for 2003. Pictured left to right, Captain Dennis Carney and Chief Mate Edmund Santos. Not pictured was Second Mate Harold Sipila.



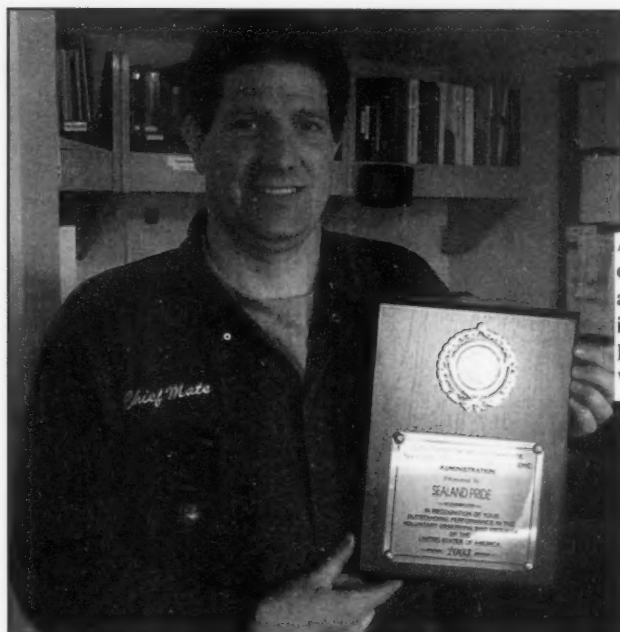
*Sealand Commitment* Captains Eric Franzen and Mike Shanley receive the annual VOS Award for the 6th consecutive year. The crew of the *Sealand Commitment* provided the National Weather Service with over 650 weather observations in 2003. Although not pictured, the following have contributed much effort in providing quality and timely marine observations; Chief Mate Gerry Parlon, Second Mate Henry Knox-Dix, Second Mate John Beatty, Second Mate Geoff Bird, Third Mate Chris Murray, and Third Mate Terry Williams. The National Weather Service and NOAA extend their thanks to both Masters and Mates for their continued support.





## VOS Awards

The *President Jackson* took top honors for a 2003 VOS Award. Pictured left to right, Second Mate Tom Tetard, Chief Mate Richard English, Captain Mike McCormick, and Third Mate Bob Amesbury.

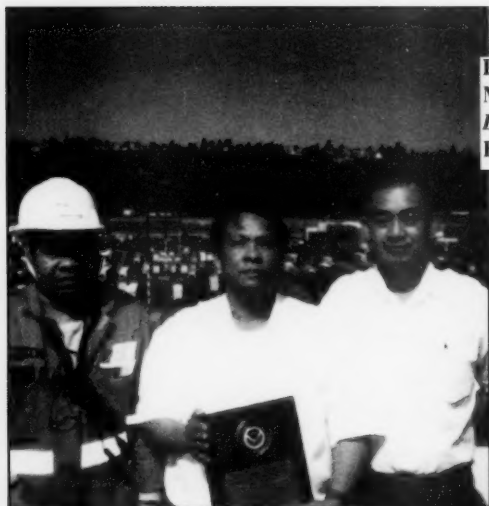


A 2003 VOS Award was presented to Chief Mate John Kelly, on the *Sealand Pride*. The vessel was noted for their timeliness and the quality of over 700 marine observations provided during 2003. Although not pictured, Captains James Brennan and Pete Mitchell are recognized for their continued support of the VOS Program.

Captain George Engbert, on the left, of the *Horizon Kodiak* received a 2003 National VOS Award from Anchorage PMO Larry Hubble, on the right, April 28, 2004 at the Port of Anchorage, Alaska. The *Horizon Kodiak* took 628 ship observations in 2003.

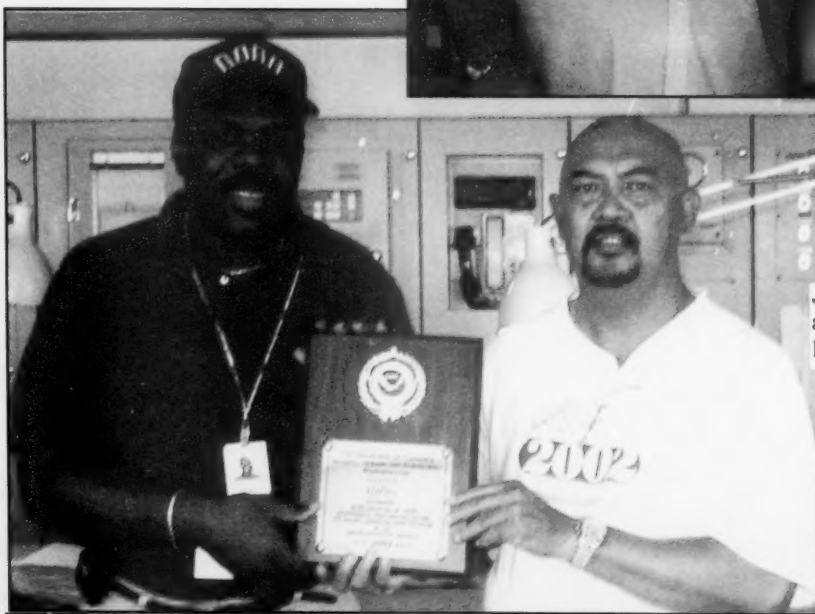


Accepting the annual VOS Award on the behalf of the crew of the *M/V Enterprise* from left to right, Chief Mate David Hutchinson, Master David Williams, Third Mate Christopher Kavanagh, Cadet Colt McCay, and (not Pictured) Second Mate Robert Guttman.



Pictured left to right is Second Officer Antonieto J. Plenos, Captain Miguel M. Fernandez, and Third Officer Bernaruo V. Telbrico of the *Westwood Borg* receiving their 2001 VOS award presented by Seattle PMO Pat Brandow.

A 2003 VOS Award was presented to Captain Bill Laverick, on the left, and First Officer Roger Calog, on the right, on the *Frances L.*



Jim Saunders, PMO pictured on the left presents a 2003 VOS Award to Second Officer Alberto P. Rocha, on the *Edyth L.*



James Saunders, PMO, on the right, presented a 2003 VOS Award to the *M/V Patriot*. Receiving the award on the left is Chief Officer Scott Wiegand and in the center is Captain Chase.



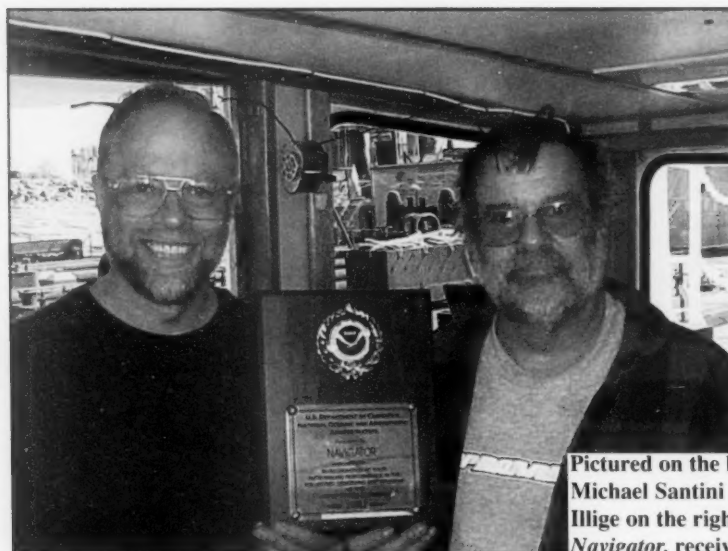
A 2002 VOS Award was presented to the *Star Eagle* and was received by Captain Jimmy Sanchez, on the right and Second Officer Edward L. Sumbillo, on the left.

Pictured left to right are Second Officer Vincenzo Deivlio, Second Officer Salvatore Pennisi, Captain Domenico Aiello, Second Officer Stefano Pedinotti, and First Officer Antonio Armenia from the LNG Tanker *Polar Eagle*, receiving their 2003 VOS Award while at the Port of Nikiski Alaska on June 14, 2004. They set a new ship record with 1,694 weather observations in 2003. This was a 47% improvement over 2002, and the 2nd highest total for any ship in Alaska history. They make 18 round trips per year from Alaska to Japan.





Pictured left to right are Second Officer Luigi Galano, Captain Pasquale Mattera and Second Officer Domenico Scano. An integral member of the team, Second Officer Franco Dicristo, was not pictured. The LNG Tanker *Arctic Sun* received their 2003 VOS Award while at the Port of Nikiski Alaska on June 13, 2004. They set a new ship record with 1,759 weather observations in 2003. This was a 44% improvement over 2002, and the highest total for any ship in Alaska history. They make 18 round trips per year from Alaska to Japan.



Pictured on the left is Captain Michael Santini and First Mate Steve Illige on the right, from the Tug *Navigator*, receiving their 2003 National VOS Award plaque while in the Port of Anchorage Alaska on May 19, 2004. The *Navigator* took 555 weather observations while in Alaskan waters during 2003.



## VOS Awards

Captain John Finney holds the award received by the *Sealand Motivator* for outstanding performance in the Voluntary Observing Ship program for the second consecutive year. In 2003 the *Sealand Motivator* provided over 660 quality marine observations. In addition, the crew also takes upper air observations under the German VOS program. Chief Mate Jack Boak, Second Mate Steve Wardman and Third Mate Mike Carlisle are not pictured, but deserve recognition for their hard work and dedication in making this program a success for the *Sealand Motivator*.



Pictured left to right are Roy Burton, Brian McMurry, and Steve Morgan. These employees on Platform Bruce in the Northern Cook Inlet waters of Alaska received a VOS Award on June 15th, 2004 for their excellent performance in 2003. They used the AMVER/SEAS software and e-mail transmission for a station record 398 weather observations.

Captain Ronelo Ledesma, on the left and Third Mate Limoel Makalintal on the right receive a VOS Award for the *Westwood Marianne*.



## VOS Awards



From left to right is ENS Nick Toth, Master James Rowe, PMO Jack Warrelmann, Third Mate Dave Nelson, and LCDR Ray Slagle from the NOAA Ship *Oregon II* receiving a 2002 VOS Award.



*NOAA Ship Oregon II*

The NOAA Ship *Oregon II* also received a 2003 VOS Award. Pictured left to right receiving the award are; the Commanding Officer, LCDR Jeff Brown, ENS Luke Spence, Chief Boatswain Roger Zirlott, Executive Officer, LT Jeremy Adams, and ENS Cozin Little.



Also present to receive the 2003 VOS Award are Kim Johnson, Science Officer and Chuck Schroeder, Electronics.



## VOS Awards

Pictured from left to right is PMO Jack Warrelmann, Captain Satish Hardas, and First Officer Girish Lele from the *M/V Bernardo Quintana A* being presented with a 2002 VOS Award.



*M/V Bernardo Quintana A*

PMO Paula Campbell also presented the *M/V Bernardo Quintana A* with a 2003 VOS Award. Pictured left to right are Chief Officer Rajiv Gandhi, PMO Paula Campbell, and Second Officer Harish K. Dhir.





## National Weather Service VOS Program New Recruits From January 1, 2004 to June 30, 2004

ARA J	V2JH	STRACHAN SHIPPING AGENCY	NEW YORK CITY, NY
AVIK	WDB7888	TUG AVIK CROWLEY MARINE SERVICES	ANCHORAGE, AK
BARENTS SEA	9VAP5	TANKER PACIFIC MANAGEMENT	NEW YORK CITY, NY
BBC DENMARK	PJGA	NORD-SUD SHIPPING	NEW ORLEANS, LA
BESIRE KALKAVAN	TCOA	RICK DOWNING, TURKON AMERICA, INC.	NORFOLK, VA
CARNIVAL LEGEND	H3VT	CARNIVAL CRUISE LINE	MIAMI, FL
CMA CGM KINGSTON	A8CS3	21ST DRAGON SHIPPING INC	NEW YORK CITY, NY
CS TYCO DECISIVE	V7DI7	TYCOM CABLE SHIP CO	BALTIMORE, MD
CSCL XIAMEN	A8CL6	CHINA SHIPPING (NORTH AMERICA)	NORFOLK, VA
CSCL BARCELONA	V2OH3	RENAISSANCE SHIPPING AGENCY, JUSTIN CRAWFORD	NEW YORK CITY, NY
DISCOVERER SPIRIT	3FTU9	TRANSOCEAN INC	HOUSTON, TX
EURO SPIRIT	ELUW8	M.O. SHIP MANAGEMENT CO. LTD, 8TH FLR SKF BLDG	NEW YORK CITY, NY
EXPRESS PHAETHON	P3TG8	FILLETTE GREEN SHIPPING SERVICES	NEW ORLEANS, LA
FOUR MOON	IBDC	GULF INLAND MARINES	NEW ORLEANS, LA
JAPAN SENATOR	9WCR2	ANDERS WILLIAMS SHIP AGENCY, INC.	NORFOLK, VA
JENS MAERSK	OYYK2	MAERSK LINE	NEW YORK CITY, NY
LIBERTY EAGLE	WHIA	LIBERTY MARITIME CORP	HOUSTON, TX
LYKES VOYAGER	VSXC7	LYKES VOYAGER - ALASKA MARITIME AGENCY	ANCHORAGE, AK
MAERSK GEORGIA	WAHP	MAERSK SEALAND	NEW YORK CITY, NY
MAERSK NANTES	V2OO7	STRACHAN SHIPPING AGENCY	NEW YORK CITY, NY
MAERSK NEWARK	A8CF2	E. R. SCHIFFAHT GMBH	NEW YORK CITY, NY
MAERSK TOYAMA	SXEL	STRACHAN SHIPPING AGENCY/DESMOND MICHAEL	NEW YORK CITY, NY
MAERSK VALENCIA	ELYT4	KERR NORTON STRACHAN AGENCY	NEW YORK CITY, NY
MARIELLE BOLTEN	ELZH9	NOVA INTERNATIONAL SHIPPING SVCS	NEW YORK CITY, NY
MARINER OF THE SEAS	C6FV9	MARINER OF THE SEAS	JACKSONVILLE, FL
MARTORELL	HPNE	MK SHIP MGT	NEW YORK CITY, NY
MICHELLE RENEE	WCY2855	MICHELLE RENEE	KODIAK, AK
MOL ENDURANCE	HPLT	NEW ASIAN SHIPPING CO, LTD	NEW YORK CITY, NY
MOL INITIATIVE	3ELL6	MOL AMERICA, INC.	NORFOLK, VA
MOSELLE	V7CY8	BARWILL AGENCIES, ED RAMOS 732 346 8340	NEW YORK CITY, NY
MSC INSA	3FWO5	MEDITERRANEAN SHIPPING CO (USA) INC.	NEW YORK CITY, NY
MSC MATILDE	HODP		NEW YORK CITY, NY
NORWEGIAN SEA	C6DM2	NORWEGIAN CRUISE LINES	HOUSTON, TX
OCEAN VICTORY	V7EB8	OCEAN VICTORY C/O DIAMOND OFFSHORE DRILLING, INC.	KODIAK, AK
OLIVIA MAERSK	OXXO2	STRACHAN SHIPPING SERVICE	MIAMI, FL
PACIFIC PATRIOT	WDB6493	PACIFIC PATRIOT C/O SEACOAST TOWING	KODIAK, AK
SAFMARINE ZAMBEZI	A8CE9	KERR NORTON STRACHAN AGENCY	NEW YORK CITY, NY
SEA PRINCE	WYT8569	SEA PRINCE C/O CROWLEY MARITIME	ANCHORAGE, AK
SPIRIT	3TFU9	SPIRIT C/O NWS PMO RICH COURTNEY	KODIAK, AK
T/V ENTERPRISE	KVMU		NEW YORK CITY, NY
TENACIOUS	WTK2123	TENACIOUS	KODIAK, AK
USCGC MAPLE (WLB 207)	NWBE	COMMANDING OFFICER USCGC MAPLE	KODIAK, AK
USCGC VIGILANT	NHIC	USCGC VIGILANT	JACKSONVILLE, FL
USNS LCPL ROY M. WHEAT	NROY	KEYSTONE PREPOSITIONING SERVICES	JACKSONVILLE, FL
WESTERN NEPTUNE	3FEN9	WESTERNGECO FLEET MANAGEMENT	HOUSTON, TX
WESTRAC II	WCU4545	WESTRAC II C/O WESTERN TOWBOAT	ANCHORAGE, AK

**-- Welcome Aboard and Thanks! -- Luke**



# VOS Cooperative Ship Report: January through June 2004

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ALASKA MARINER	WSM5364	Anchorage	1	0	0	10	0	0	0	0	0	0	0	0	11
ARCTIC SUN	ELQB8	Anchorage	187	174	168	183	82	96	0	0	0	0	0	0	890
AVIK	WDB7888	Anchorage	0	0	0	0	0	9	0	0	0	0	0	0	9
BRUCE	WWU8	Anchorage	36	23	26	25	28	24	0	0	0	0	0	0	162
GALE WIND	WAZ9548	Anchorage	1	2	7	4	12	9	0	0	0	0	0	0	35
GLADIATOR	WBN5982	Anchorage	0	0	0	0	13	8	0	0	0	0	0	0	21
GUARDIAN	WBO2511	Anchorage	0	0	0	0	1	0	0	0	0	0	0	0	1
GUARDSMAN	WBN5978	Anchorage	67	73	72	34	24	44	0	0	0	0	0	0	314
GULF TITAN	WDA5598	Anchorage	7	8	9	8	11	5	0	0	0	0	0	0	48
HORIZON ANCHORAGE	KGTX	Anchorage	90	43	81	94	66	54	0	0	0	0	0	0	428
HORIZON KODIAK	KGTZ	Anchorage	45	50	82	70	86	74	0	0	0	0	0	0	407
HORIZON TACOMA	KGTY	Anchorage	52	68	54	44	51	31	0	0	0	0	0	0	300
JAG PRAKASH	AUBK	Anchorage	87	85	121	102	90	75	0	0	0	0	0	0	560
LYKES EAGLE	VSUA7	Anchorage	12	5	51	28	24	13	0	0	0	0	0	0	133
NAVIGATOR	WBO3345	Anchorage	0	0	0	0	48	70	0	0	0	0	0	0	118
OCEAN MARINER	WCF3990	Anchorage	1	0	0	0	0	0	0	0	0	0	0	0	1
OCEAN RANGER	WAM7635	Anchorage	0	4	5	1	4	0	0	0	0	0	0	0	14
PANDALUS	WAV7611	Anchorage	0	0	1	0	0	1	0	0	0	0	0	0	2
POINT BARROW	WBM5088	Anchorage	0	0	0	0	22	16	0	0	0	0	0	0	38
POLAR EAGLE	ELPT3	Anchorage	183	176	174	153	187	88	0	0	0	0	0	0	961
PT. THOMPSON	WBN5092	Anchorage	0	0	0	0	27	0	0	0	0	0	0	0	27
R/V TIGLAX	WZ3423	Anchorage	0	0	0	14	22	14	0	0	0	0	0	0	50
REDOUBT	WCG3013	Anchorage	0	0	0	11	9	7	0	0	0	0	0	0	27
SEA PRINCE	WYT8569	Anchorage	0	0	0	0	50	83	0	0	0	0	0	0	133
SEA RANGER	WBM8733	Anchorage	0	0	22	13	19	19	0	0	0	0	0	0	73
SEA VENTURE	WCC7684	Anchorage	0	0	0	0	16	5	0	0	0	0	0	0	21
SEA VIKING	WCE8951	Anchorage	0	0	0	0	20	9	0	0	0	0	0	0	29
SEABULK MONTANA	WCW9126	Anchorage	90	120	68	19	114	102	0	0	0	0	0	0	513
SENECA	WBN8469	Anchorage	0	0	0	60	83	99	0	0	0	0	0	0	242
SINUK	WCQ8110	Anchorage	0	0	0	93	171	139	0	0	0	0	0	0	403
SIOUX	WBN7617	Anchorage	0	0	0	0	1	60	0	0	0	0	0	0	61
WESTERN MARINER	WRB9690	Anchorage	1	0	0	0	0	0	0	0	0	0	0	0	1
WESTERN NAVIGATOR	WAX7602	Anchorage	0	0	0	0	14	0	0	0	0	0	0	0	14
WESTERN RANGER	WBN3008	Anchorage	0	0	0	0	39	31	0	0	0	0	0	0	70

Anchorage Ships: 34

Totals: 860 831 941 966 1334 1185 0 0 0 0 0 0 0 6117

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
MAERSK TAIKI	9VIG	Baltimore	48	30	36	23	42	11	0	0	0	0	0	0	190
PREMIUM DO BRASIL	A8BL4	Baltimore	26	26	9	7	14	13	0	0	0	0	0	0	95
M/T SUN VOYAGER	C6FD3	Baltimore	1	12	4	0	0	0	0	0	0	0	0	0	17
CHIQUITA SCANDINAVIA	C6KD4	Baltimore	66	43	55	48	50	50	0	0	0	0	0	0	312
CHIQUITA ITALIA	C6KD5	Baltimore	48	57	50	48	58	45	0	0	0	0	0	0	306
CHIQUITA NEDERLAND	C6KD6	Baltimore	36	52	47	34	51	42	0	0	0	0	0	0	262
CHIQUITA BELGIE	C6KD7	Baltimore	53	52	60	52	43	28	0	0	0	0	0	0	288
CHIQUITA DEUTSCHLAND	C6KD8	Baltimore	78	57	76	60	66	62	0	0	0	0	0	0	399
CHIQUITA SCHWEIZ	C6KD9	Baltimore	49	41	44	17	37	38	0	0	0	0	0	0	226
AUCKLAND STAR	C6KV2	Baltimore	0	0	0	0	0	0	0	0	0	0	0	0	0
HOOD ISLAND	C6LU4	Baltimore	44	46	19	27	54	58	0	0	0	0	0	0	248
ORION VOYAGER	C6MC5	Baltimore	0	0	0	0	20	80	0	0	0	0	0	0	100
TROJAN STAR	C6OD7	Baltimore	21	0	0	13	0	0	0	0	0	0	0	0	34
ALTAR VOYAGER	C6OK	Baltimore	84	53	36	34	30	32	0	0	0	0	0	0	269
EDYTH L	C6YC	Baltimore	46	40	49	63	57	50	0	0	0	0	0	0	305

# VOS Cooperative Ship Report



FRANCES L	C6YE	Baltimore	36	34	36	47	37	25	0	0	0	0	0	0	215
HADERA	ELBX4	Baltimore	0	11	8	0	56	0	0	0	0	0	0	0	75
OURO DO BRASIL	ELPP9	Baltimore	0	0	25	40	29	7	0	0	0	0	0	0	101
SOL DO BRASIL	ELQQ4	Baltimore	5	6	15	36	53	26	0	0	0	0	0	0	141
PITTSBURG	ELTQ6	Baltimore	74	67	67	61	36	55	0	0	0	0	0	0	360
SAUDI ABHA	HZRX	Baltimore	33	3	44	41	23	10	0	0	0	0	0	0	154
MAERSK ALASKA	KAKF	Baltimore	20	31	0	0	0	0	0	0	0	0	0	0	51
TAKASAGO	LACR5	Baltimore	35	32	19	0	0	7	0	0	0	0	0	0	93
STAR HARMONIA	LAGB5	Baltimore	78	18	24	47	0	28	0	0	0	0	0	0	195
STAR ISMENE	LANT5	Baltimore	31	45	56	28	31	27	0	0	0	0	0	0	218
STAR HERDLA	LAVD4	Baltimore	0	49	22	1	16	21	0	0	0	0	0	0	109
STAR HIDRA	LAVN4	Baltimore	0	0	30	9	0	33	0	0	0	0	0	0	72
STAR ALABAMA	LAVU4	Baltimore	35	50	65	37	43	15	0	0	0	0	0	0	245
STAR EAGLE	LAWO2	Baltimore	57	30	11	0	7	32	0	0	0	0	0	0	137
TAMPA	LMWO3	Baltimore	0	0	0	0	0	9	0	0	0	0	0	0	9
TREIN MAERSK	MSQQ8	Baltimore	47	22	46	17	18	40	0	0	0	0	0	0	190
STAR INDIANA	S6BE	Baltimore	21	8	56	55	55	33	0	0	0	0	0	0	228
FIGARO	S6PI	Baltimore	18	0	27	22	11	21	0	0	0	0	0	0	99
MAERSK WIND	S6TY	Baltimore	4	0	0	0	0	0	0	0	0	0	0	0	4
TYCO RESPONDER	V7CY9	Baltimore	48	12	0	3	0	0	0	0	0	0	0	0	63
CS TYCO DECISIVE	V7DI7	Baltimore	0	0	37	53	0	0	0	0	0	0	0	0	90
M/V RESOLVE	WCZ5535	Baltimore	39	20	4	0	0	0	0	0	0	0	0	0	63
M/V FREEDOM	WDB5483	Baltimore	34	37	38	39	38	37	0	0	0	0	0	0	223
GREEN LAKE	WDDI	Baltimore	11	77	66	75	0	0	0	0	0	0	0	0	229
ITB JACKSONVILLE	WNDG	Baltimore	0	0	0	0	2	0	0	0	0	0	0	0	2
M/V PATRIOT	WQVY	Baltimore	9	12	50	16	36	39	0	0	0	0	0	0	162
INDEPENDENCE	WRYG	Baltimore	33	45	0	25	50	60	0	0	0	0	0	0	213
LIBERTY	WRYX	Baltimore	28	41	24	55	50	55	0	0	0	0	0	0	253
GLOBAL SENTINEL	WRZU	Baltimore	0	0	0	0	0	2	0	0	0	0	0	0	2
PRIDE OF BALTIMORE II	WUW2120	Baltimore	0	0	0	0	5	32	0	0	0	0	0	0	37
ITB NEW YORK	WVDG	Baltimore	10	6	8	0	0	23	0	0	0	0	0	0	47
ITB BALTIMORE	WXKM	Baltimore	8	14	30	5	21	9	0	0	0	0	0	0	87
COURTNEY L	ZCAQ8	Baltimore	0	13	7	7	31	30	0	0	0	0	0	0	88
DUHALLOW	ZCBH9	Baltimore	24	6	0	0	0	0	0	0	0	0	0	0	30
SKODSBORG	ZCIJ7	Baltimore	0	17	33	39	20	9	0	0	0	0	0	0	118

Baltimore Ships: 50

Totals: 1338 1215 1333 1184 1190 1194 0 0 0 0 0 0 0 7454

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
MAERSK CAROLINA	WBDS	Charleston	9	0	23	30	36	40	0	0	0	0	0	0	138
MAERSK MALACCA	9VIN7	Charleston	0	0	0	0	0	8	0	0	0	0	0	0	8
SEALAND RACER	MCDW2	Charleston	46	29	4	4	48	0	0	0	0	0	0	0	131

Charleston Ships: 3

Totals: 55 29 27 34 84 48 0 0 0 0 0 0 0 277

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ARTHUR M. ANDERSON	WE4805	Chicago	49	0	3	42	21	21	0	0	0	0	0	0	136
BARBARA ANDRIE	WTC9407	Chicago	0	0	0	6	6	0	0	0	0	0	0	0	12
BURNS HARBOR	WDB4745	Chicago	4	0	0	11	3	0	0	0	0	0	0	0	18
CASON J. CALLAWAY	WE4879	Chicago	1	0	3	45	36	4	0	0	0	0	0	0	89
EDGAR B. SPEER	WQZ9670	Chicago	69	0	0	0	41	63	0	0	0	0	0	0	173
INDIANA HARBOR	WXN3191	Chicago	40	0	0	74	1	0	0	0	0	0	0	0	115
INLAND SEAS	WCJ6214	Chicago	0	0	0	0	1	0	0	0	0	0	0	0	1
JACKLYN M.	WCV7620	Chicago	10	0	0	3	4	0	0	0	0	0	0	0	17
JAMES R. BARKER	WYP8657	Chicago	0	0	19	190	77	82	0	0	0	0	0	0	368
JOHN G. MUNSON	WE3806	Chicago	12	0	1	2	0	8	0	0	0	0	0	0	23
JOSEPH L. BLOCK	WDA2768	Chicago	0	0	0	13	3	7	0	0	0	0	0	0	23
KAREN ANDRIE	WBS5272	Chicago	0	0	0	3	0	0	0	0	0	0	0	0	3
KAYE E. BARKER	WCF3012	Chicago	4	0	0	42	22	4	0	0	0	0	0	0	72



# VOS Cooperative Ship Report

KIYI	KA0107	Chicago	0	0	0	0	0	6	0	0	0	0	0	0	6
MARK HANNAH	WYZ5243	Chicago	0	0	0	13	22	20	0	0	0	0	0	0	55
MCKEE SONS	WCZ9703	Chicago	0	0	6	64	26	33	0	0	0	0	0	0	129
MESABI MINER	WYQ4356	Chicago	0	0	0	30	36	17	0	0	0	0	0	0	83
MICHIGAN	WRB4141	Chicago	0	0	0	4	4	0	0	0	0	0	0	0	8
PAUL R. TREGURTHA	WYR4481	Chicago	0	0	32	89	84	88	0	0	0	0	0	0	293
PHILIP R. CLARKE	WE3592	Chicago	0	0	0	0	0	2	0	0	0	0	0	0	2
PRESQUE ISLE	WZE4928	Chicago	0	0	0	5	21	43	0	0	0	0	0	0	69
REBECCA LYNN	WCW7977	Chicago	1	0	0	0	0	0	0	0	0	0	0	0	1
ROGER BLOUGH	WZP8164	Chicago	29	0	0	0	1	0	0	0	0	0	0	0	30
SOUTHDOWN CHALLENGER	WA4659	Chicago	4	0	0	14	12	0	0	0	0	0	0	0	30
STEWART J. CORT	WDB4570	Chicago	15	0	0	42	16	0	0	0	0	0	0	0	73
USCGC MACKINAW	NRKP	Chicago	2	3	0	0	0	0	0	0	0	0	0	0	5
WILFRED SYKES	WDA2769	Chicago	0	0	0	34	20	10	0	0	0	0	0	0	64

Chicago Ships: 27 Totals: 240 3 64 726 457 408 0 0 0 0 0 0 0 1898

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
KILO MOANA	WDA7827	Honolulu	0	8	45	67	64	52	0	0	0	0	0	0	236
NOAA SHIP KA'IMIMOANA	WTEU	Honolulu	12	0	35	19	93	33	0	0	0	0	0	0	192

Honolulu Ships: 2 Totals: 12 8 80 86 157 85 0 0 0 0 0 0 0 428

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
BUFFALO SOLDIER	WWXB	Houston	0	21	13	0	69	0	0	0	0	0	0	0	103
CAPE VINCENT	KAES	Houston	0	42	36	55	1	0	0	0	0	0	0	0	134
CELEBRATION	H3GQ	Houston	19	19	26	0	0	2	0	0	0	0	0	0	66
CHEMICAL EXPLORER	KRGC	Houston	16	13	10	15	12	0	0	0	0	0	0	0	66
CHEMICAL PIONEER	KAFO	Houston	16	1	21	27	5	0	0	0	0	0	0	0	70
CLEVELAND	KGXA	Houston	85	48	8	45	35	20	0	0	0	0	0	0	241
CYNTHIA FAGAN	KSDF	Houston	47	15	19	0	0	10	0	0	0	0	0	0	91
DEEPWATER HORIZON	H3SM	Houston	50	115	81	28	55	64	0	0	0	0	0	0	393
DEEPWATER MILLENNIUM	3FJA9	Houston	0	0	0	0	0	19	0	0	0	0	0	0	19
DEEPWATER PATHFINDER	HP9216	Houston	0	0	0	0	0	0	0	0	0	0	0	0	0
DISCOVERER SPIRIT	3FTU9	Houston	0	0	0	0	0	4	0	0	0	0	0	0	4
EASTERN EXPRESS	3FDN7	Houston	22	9	0	35	70	30	0	0	0	0	0	0	166
GUS W. DARNELL	KCDK	Houston	24	20	10	16	20	27	0	0	0	0	0	0	117
HUMBER ARM	ZCBQ2	Houston	0	4	10	43	20	0	0	0	0	0	0	0	77
LIBERTY EAGLE	WHIA	Houston	0	0	0	21	13	0	0	0	0	0	0	0	34
LIBERTY WAVE	KRHZ	Houston	0	10	2	7	9	6	0	0	0	0	0	0	34
LYKES DISCOVERER	WGXA	Houston	138	80	104	76	61	47	0	0	0	0	0	0	506
LYKES EXPLORER	WGLA	Houston	50	98	108	41	45	43	0	0	0	0	0	0	385
LYKES LIBERATOR	WGXN	Houston	77	53	77	62	66	57	0	0	0	0	0	0	392
LYKES MOTIVATOR	WABU	Houston	32	46	41	30	27	27	0	0	0	0	0	0	203
LYKES NAVIGATOR	WGMJ	Houston	103	170	209	71	49	0	0	0	0	0	0	0	602
LYKES RANGER	ZIYE7	Houston	0	26	31	35	30	30	0	0	0	0	0	0	152
MAERSK CONSTELLATION	WRYJ	Houston	7	0	59	4	25	0	0	0	0	0	0	0	95
NOBEL STAR	KRPP	Houston	68	78	55	25	21	15	0	0	0	0	0	0	262
NORWGEIAN SEA	C6DM2	Houston	0	54	88	67	99	74	0	0	0	0	0	0	382
NUEVO LEON	VQHV6	Houston	9	0	0	0	0	0	0	0	0	0	0	0	9
OVERSEAS HARRIETTE	WRFJ	Houston	29	45	44	12	16	23	0	0	0	0	0	0	169
OVERSEAS MARILYN	WFQB	Houston	6	0	0	3	2	0	0	0	0	0	0	0	11
OVERSEAS NEW ORLEANS	WFKW	Houston	27	36	29	31	16	15	0	0	0	0	0	0	154
OVERSEAS PHILADELPHIA	WGDB	Houston	0	0	0	0	17	0	0	0	0	0	0	0	17
PACIFIC EXPLORER	V7DN3	Houston	41	39	38	21	4	1	0	0	0	0	0	0	144
PERSEVERANCE	WSKH	Houston	0	0	0	0	0	0	0	0	0	0	0	0	0
RHAPSODY OF THE SEAS	LAZK4	Houston	75	42	30	33	30	31	0	0	0	0	0	0	241
SAUDI DIRIYAH	HZZB	Houston	43	19	29	75	29	30	0	0	0	0	0	0	225
SAUDI HOFUF	HZZC	Houston	57	62	2	67	40	27	0	0	0	0	0	0	255

# VOS Cooperative Ship Report



SAUDI TABUK	HZZD	Houston	37	68	77	56	40	16	0	0	0	0	0	0	294
SCHACKENBORG	ZCIH7	Houston	0	0	27	20	10	38	0	0	0	0	0	0	95
SEALAND ACHIEVER	WPKD	Houston	53	41	46	31	41	40	0	0	0	0	0	0	252
SEALAND ATLANTIC	KRLZ	Houston	77	65	99	63	48	63	0	0	0	0	0	0	415
SEALAND COMMITMENT	KRPB	Houston	90	62	104	45	88	63	0	0	0	0	0	0	452
SEALAND DEVELOPER	KHRH	Houston	67	30	30	105	41	23	0	0	0	0	0	0	296
SEALAND FLORIDA	KRHX	Houston	114	93	55	59	49	46	0	0	0	0	0	0	416
SEALAND INTEGRITY	WPVD	Houston	277	330	177	141	159	64	0	0	0	0	0	0	1148
SEALAND MOTIVATOR	WAAH	Houston	89	80	98	113	90	88	0	0	0	0	0	0	558
SEALAND PERFORMANCE	KRPD	Houston	32	90	78	64	43	19	0	0	0	0	0	0	326
SEALAND PRIDE	WDA3673	Houston	87	79	7	110	62	66	0	0	0	0	0	0	411
SEALAND QUALITY	KRNJ	Houston	57	57	95	62	44	9	0	0	0	0	0	0	324
SKANDERBORG	ZCIG4	Houston	31	0	0	0	16	15	0	0	0	0	0	0	62
STAR FLORIDA	LAVW4	Houston	24	0	25	0	17	0	0	0	0	0	0	0	66
STAR FRASER	LAVY4	Houston	0	44	23	2	41	9	0	0	0	0	0	0	119
STAR ISTIND	LAMP5	Houston	30	28	4	8	7	3	0	0	0	0	0	0	80
TEXAS CLIPPER II	KVWA	Houston	0	0	0	0	0	60	0	0	0	0	0	0	60
TMM CAMPECHE	VSXC9	Houston	2	2	1	0	0	0	0	0	0	0	0	0	5
USNS MARY SEARS (T-AGS 6)	NRFR	Houston	1	0	0	0	0	0	0	0	0	0	0	0	1

Houston Ships: 54 Totals: 2109 2234 2126 1824 1682 1224 0 0 0 0 0 0 0 11199

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1ST LT HARRY L. MARTIN	NDFH	Jacksonville	0	18	70	10	27	17	0	0	0	0	0	0	142
CARNIVAL FANTASY	H3GS	Jacksonville	0	4	7	3	8	8	0	0	0	0	0	0	30
CARNIVAL GLORY	3FPS9	Jacksonville	34	22	24	5	12	18	0	0	0	0	0	0	115
CONTI CARTAGENA	DGVN	Jacksonville	30	4	1	0	0	0	0	0	0	0	0	0	35
DISNEY MAGIC	C6PT7	Jacksonville	0	0	14	18	0	0	0	0	0	0	0	0	32
EL MORRO	KCGH	Jacksonville	0	0	23	4	19	4	0	0	0	0	0	0	50
EL YUNQUE	WGJT	Jacksonville	3	48	67	42	36	45	0	0	0	0	0	0	241
GREEN DALE	WCZ5238	Jacksonville	16	12	12	9	2	12	0	0	0	0	0	0	63
HARMONY ACE	H3QA	Jacksonville	60	54	54	66	51	8	0	0	0	0	0	0	293
HORIZON CHALLENGER	WZJC	Jacksonville	0	39	78	64	67	69	0	0	0	0	0	0	317
HORIZON CRUSADER	WZJF	Jacksonville	0	51	2	47	50	55	0	0	0	0	0	0	205
HORIZON DISCOVERY	WZJD	Jacksonville	0	41	55	55	60	48	0	0	0	0	0	0	259
LTC CALVIN P. TITUS	KJLV	Jacksonville	35	9	0	0	0	0	0	0	0	0	0	0	44
MAERSK TAIYO	9VJO	Jacksonville	0	0	0	0	0	34	0	0	0	0	0	0	34
NOAA SHIP OSCAR ELTON SE	WTEE	Jacksonville	53	5	41	40	39	48	0	0	0	0	0	0	226
OVERSEAS JOYCE	WUQL	Jacksonville	19	20	4	20	14	8	0	0	0	0	0	0	85
SOLAR WING	ELJS7	Jacksonville	94	92	98	100	103	92	0	0	0	0	0	0	579
STAR AMERICA	LAVV4	Jacksonville	43	38	21	27	41	16	0	0	0	0	0	0	186
STAR EVVIVA	LAHE2	Jacksonville	61	49	0	29	8	3	0	0	0	0	0	0	150
STAR HANSA	LAXP4	Jacksonville	12	0	6	19	0	0	0	0	0	0	0	0	37
TALISMAN	LAOW5	Jacksonville	21	17	0	0	15	7	0	0	0	0	0	0	60

Jacksonville Ships: 21 Totals: 481 523 577 558 552 492 0 0 0 0 0 0 0 3183

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ALPHA HELIX	WSD7078	Kodiak	0	0	5	0	35	3	0	0	0	0	0	0	43
ATLANTIS	KAQP	Kodiak	0	0	0	6	5	8	0	0	0	0	0	0	19
AURORA	WYM9567	Kodiak	17	12	0	0	0	4	0	0	0	0	0	0	33
BLARNEY	WBP4766	Kodiak	0	5	0	17	3	0	0	0	0	0	0	0	25
BOUCHARD BOYS	WCY7761	Kodiak	12	12	0	0	0	0	0	0	0	0	0	0	24
BOWFIN	WSX7318	Kodiak	0	1	1	0	0	1	0	0	0	0	0	0	3
CAPT LES EASOM	WTT8587	Kodiak	2	0	0	0	3	0	0	0	0	0	0	0	5
CHINOOK	WCY2791	Kodiak	7	0	0	0	0	0	0	0	0	0	0	0	7
COASTAL EXPLORER	WCY3172	Kodiak	0	0	0	1	1	8	0	0	0	0	0	0	10
COASTAL PILOT	WBP7281	Kodiak	3	0	1	0	0	0	0	0	0	0	0	0	4
COASTAL RELIANCE	WADZ	Kodiak	17	8	13	40	43	13	0	0	0	0	0	0	134



## VOS Cooperative Ship Report

COASTAL TRADER	WSL8560	Kodiak	0	0	1	1	0	0	0	0	0	0	0	0	2
COIN OF THE REALM	KLOYL	Kodiak	0	0	0	0	0	0	0	0	0	0	0	0	0
CORBIN FOSS	WDB5265	Kodiak	0	9	0	1	0	0	0	0	0	0	0	0	10
DIANE H.	WUR7250	Kodiak	0	0	0	3	0	0	0	0	0	0	0	0	3
DREW FOSS	WYL7518	Kodiak	0	0	6	22	0	0	0	0	0	0	0	0	28
EMMA FOSS	WCF3931	Kodiak	0	0	0	0	0	0	0	0	0	0	0	0	0
FISHHAWK	WRB5085	Kodiak	0	0	0	0	21	8	0	0	0	0	0	0	29
GLADIATOR	WCZ9000	Kodiak	0	0	0	0	0	3	0	0	0	0	0	0	3
GRETA	WCY2853	Kodiak	0	0	0	0	24	6	0	0	0	0	0	0	30
GYR FALCON	WCU6587	Kodiak	0	0	1	2	0	0	0	0	0	0	0	0	3
HENRY SAUSE	WTW9259	Kodiak	1	0	0	0	0	0	0	0	0	0	0	0	1
HMI BRENTON REEF	WCY8453	Kodiak	63	37	53	36	49	0	0	0	0	0	0	0	238
IVER FOSS	WYE6442	Kodiak	0	0	0	1	0	6	0	0	0	0	0	0	7
JEFFREY FOSS	WCX4608	Kodiak	0	0	0	0	0	10	0	0	0	0	0	0	10
JOHN BRIX	WCY7560	Kodiak	7	19	12	0	0	0	0	0	0	0	0	0	38
JOSEPH SAUSE	WTW9258	Kodiak	1	0	0	0	0	0	0	0	0	0	0	0	1
JUSTINE FOSS	WYL4978	Kodiak	8	6	1	0	5	8	0	0	0	0	0	0	28
KENAI	WSNB	Kodiak	49	105	20	4	5	11	0	0	0	0	0	0	194
KENNICOTT	WCY2920	Kodiak	0	0	47	32	69	52	0	0	0	0	0	0	200
LNG GEMINI	V7BW9	Kodiak	31	29	27	19	25	15	0	0	0	0	0	0	146
LOIS H.	WTD4576	Kodiak	0	0	0	0	2	1	0	0	0	0	0	0	3
MALOLO	WYH6327	Kodiak	6	8	0	0	0	0	0	0	0	0	0	0	14
MANFRED NYSTROM	WCN3590	Kodiak	0	20	12	19	10	4	0	0	0	0	0	0	65
MAUNA LOA	WCY8398	Kodiak	3	0	0	0	0	0	0	0	0	0	0	0	3
MIKI HANA	WTW9252	Kodiak	5	0	0	0	0	6	0	0	0	0	0	0	11
MIKI MIKI	WTW9266	Kodiak	0	1	4	0	0	0	0	0	0	0	0	0	5
NATOMA	WBB5799	Kodiak	6	0	0	0	0	0	0	0	0	0	0	0	6
NAVAJO	WCT5737	Kodiak	2	15	3	4	7	6	0	0	0	0	0	0	37
NORCOASTER	WYP7276	Kodiak	0	0	0	0	4	0	0	0	0	0	0	0	4
NORMA H.	WYL6686	Kodiak	0	0	0	0	16	0	0	0	0	0	0	0	16
NORTHERN SPIRIT	WAQ2746	Kodiak	27	75	0	0	0	0	0	0	0	0	0	0	102
NORTHERN VICTOR	WCZ6534	Kodiak	12	0	0	4	0	4	0	0	0	0	0	0	20
OCEAN RELIANCE	WADY	Kodiak	1	4	8	15	8	29	0	0	0	0	0	0	65
OCEAN SERVICE	WTW9263	Kodiak	6	1	0	0	4	0	0	0	0	0	0	0	11
OCEAN VICTORY	V7EB8	Kodiak	0	0	0	0	0	59	0	0	0	0	0	0	59
OCEAN WARRIOR	NL9WX	Kodiak	0	0	0	0	0	0	0	0	0	0	0	0	0
OVERSEAS CHICAGO	KBCF	Kodiak	38	27	4	0	0	0	0	0	0	0	0	0	69
OVERSEAS NEW YORK	WMCK	Kodiak	48	30	45	0	0	5	0	0	0	0	0	0	128
PACIFIC AVENGER	WCY8175	Kodiak	0	1	2	0	1	0	0	0	0	0	0	0	4
PACIFIC CHALLENGER	WDA3588	Kodiak	81	22	67	153	147	141	0	0	0	0	0	0	611
PACIFIC FREEDOM	WDJF	Kodiak	0	2	8	0	0	10	0	0	0	0	0	0	20
PACIFIC PATRIOT	WDB6493	Kodiak	0	0	3	3	14	13	0	0	0	0	0	0	33
PACIFIC PRIDE	WCN4995	Kodiak	0	3	38	34	0	8	0	0	0	0	0	0	83
PACIFIC RAVEN	WYZ3112	Kodiak	0	4	16	7	13	16	0	0	0	0	0	0	56
PARAGON	WDA2311	Kodiak	79	56	43	51	54	58	0	0	0	0	0	0	341
ROBERT L.	WTW9264	Kodiak	0	1	1	0	0	0	0	0	0	0	0	0	2
ROUGHNECK	WTW9262	Kodiak	3	13	9	4	5	6	0	0	0	0	0	0	40
SALISHAN	WUT4384	Kodiak	5	2	0	0	0	0	0	0	0	0	0	0	7
SAMSON MARINER	WCN3586	Kodiak	6	2	6	6	14	2	0	0	0	0	0	0	36
SANDRA FOSS	WYL4908	Kodiak	0	0	0	0	11	10	0	0	0	0	0	0	21
SEA RELIANCE	WEOB	Kodiak	18	17	14	1	0	0	0	0	0	0	0	0	50
SEA STORM	WCV9132	Kodiak	0	0	0	0	0	5	0	0	0	0	0	0	5
SEABULK ARCTIC	WCY7054	Kodiak	24	26	24	15	6	10	0	0	0	0	0	0	105
SEABULK PRIDE	WCY7052	Kodiak	35	38	21	8	24	17	0	0	0	0	0	0	143
SIDNEY FOSS	WYL5445	Kodiak	0	0	0	19	32	12	0	0	0	0	0	0	63
SNOHOMISH	WSQ8098	Kodiak	0	0	2	0	0	0	0	0	0	0	0	0	2
SOUND RELIANCE	WXAE	Kodiak	24	12	16	13	9	6	0	0	0	0	0	0	80
SPIRIT	3TFU9	Kodiak	0	0	0	0	0	9	0	0	0	0	0	0	9
STACEY FOSS	WYL4909	Kodiak	0	0	0	0	0	14	0	0	0	0	0	0	14
STIMSON	WCY2270	Kodiak	26	6	5	77	4	4	0	0	0	0	0	0	122
TAKU	WI9491	Kodiak	13	9	9	11	26	12	0	0	0	0	0	0	80

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TENACIOUS	WTK2123	Kodiak	0	0	0	0	0	1	0	0	0	0	0	0	1
TITAN	WAW9232	Kodiak	7	5	7	4	9	2	0	0	0	0	0	0	34
TONSINA	KJGD	Kodiak	11	30	9	11	14	1	0	0	0	0	0	0	76
TRIDENT	WCZ2913	Kodiak	1	0	1	6	0	0	0	0	0	0	0	0	8
TUSTUMENA	WNGW	Kodiak	106	25	0	19	63	24	0	0	0	0	0	0	237
USCGC ALEX HALEY	NZPO	Kodiak	0	5	4	0	0	0	0	0	0	0	0	0	9
USCGC EAGLE (WIX 327)	NRCB	Kodiak	1	0	0	0	0	0	0	0	0	0	0	0	1
USCGC SPAR	NJAR	Kodiak	0	0	0	0	0	1	0	0	0	0	0	0	1
USCGC STORIS (WMEC 38)	NRUC	Kodiak	7	0	0	0	0	0	0	0	0	0	0	0	7
VIKING STAR	WAS4138	Kodiak	10	5	3	3	2	0	0	0	0	0	0	0	23
WOLDSTAD	WCY2271	Kodiak	19	30	31	7	11	28	0	0	0	0	0	0	126
ZENITH	WBV3237	Kodiak	0	1	2	2	2	0	0	0	0	0	0	0	7

Kodiak	Ships: 84	Totals:	848	739	605	681	800	680	0	0	0	0	0	0	4353
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Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
APL AMAZONITE	9VBX	Long Beach	0	0	0	0	9	13	0	0	0	0	0	0	22
APL CHINA	WDB3161	Long Beach	40	41	58	48	54	54	0	0	0	0	0	0	295
APL KOREA	WCX8883	Long Beach	15	15	19	22	35	24	0	0	0	0	0	0	130
APL PHILIPPINES	WCX8884	Long Beach	50	25	11	17	42	23	0	0	0	0	0	0	168
APL SINGAPORE	WCX8812	Long Beach	49	47	53	65	45	36	0	0	0	0	0	0	295
APL THAILAND	WCX8882	Long Beach	58	37	25	38	16	24	0	0	0	0	0	0	198
CALIFORNIA JUPITER	ELKU8	Long Beach	0	5	0	0	0	0	0	0	0	0	0	0	5
DENALI	WSVR	Long Beach	16	13	16	13	18	20	0	0	0	0	0	0	96
DIRCH MAERSK	OXQP2	Long Beach	6	53	0	63	0	62	0	0	0	0	0	0	184
EVER ROUND	3FQN3	Long Beach	0	0	0	0	0	0	0	0	0	0	0	0	0
EVER ROYAL	3FGI3	Long Beach	0	6	0	15	0	0	0	0	0	0	0	0	21
EWA	WEZM	Long Beach	61	56	35	51	29	23	0	0	0	0	0	0	255
HANSA INDIA	ELYD5	Long Beach	68	42	56	36	21	32	0	0	0	0	0	0	255
HORIZON CONSUMER	WCHF	Long Beach	21	39	52	31	29	40	0	0	0	0	0	0	212
HORIZON NAVIGATOR	WPGK	Long Beach	29	61	61	43	48	35	0	0	0	0	0	0	277
HORIZON PACIFIC	WSRL	Long Beach	69	60	55	72	58	52	0	0	0	0	0	0	366
HORIZON RELIANCE	WFLH	Long Beach	78	69	71	79	80	62	0	0	0	0	0	0	439
KAUAI	WSRH	Long Beach	63	62	37	31	48	47	0	0	0	0	0	0	288
MAREN MAERSK	OWZU2	Long Beach	38	13	31	11	44	4	0	0	0	0	0	0	141
MARGRETHE MAERSK	OYSN2	Long Beach	31	9	13	6	14	34	0	0	0	0	0	0	107
MATHILDE MAERSK	OOUU2	Long Beach	16	32	22	29	25	35	0	0	0	0	0	0	159
MAUI	WSLH	Long Beach	53	62	43	51	34	40	0	0	0	0	0	0	283
MELVILLE	WECB	Long Beach	46	51	48	28	26	39	0	0	0	0	0	0	238
METTE MAERSK	OXKT2	Long Beach	23	25	21	37	21	25	0	0	0	0	0	0	152
NEW HORIZON	WKWB	Long Beach	0	14	12	4	2	11	0	0	0	0	0	0	43
NOAA DAVID STARR JORDAN	WTDK	Long Beach	5	0	0	0	41	46	0	0	0	0	0	0	92
OOCL FAIR	VRWB8	Long Beach	38	27	0	5	0	4	0	0	0	0	0	0	74
OOCL FIDELITY	VRWG5	Long Beach	1	0	2	1	0	3	0	0	0	0	0	0	7
OOCL NETHERLANDS	VRVN6	Long Beach	4	0	0	0	0	3	0	0	0	0	0	0	7
POLAR CALIFORNIA	WMCV	Long Beach	9	15	60	33	11	3	0	0	0	0	0	0	131
PRESIDENT GRANT	WCY2098	Long Beach	56	61	54	39	43	22	0	0	0	0	0	0	275
PRESIDENT WILSON	WCY3438	Long Beach	26	44	46	31	44	45	0	0	0	0	0	0	236
R.J. PFEIFFER	WRJP	Long Beach	31	32	17	18	29	26	0	0	0	0	0	0	153
SEALAND EAGLE	MCDZ9	Long Beach	20	23	11	20	3	14	0	0	0	0	0	0	91
SEALAND EXPRESS	KGJD	Long Beach	15	61	297	334	498	361	0	0	0	0	0	0	1566
SEALAND VOYAGER	KHRK	Long Beach	69	72	60	26	9	6	0	0	0	0	0	0	242
STAR GRAN	LADR4	Long Beach	0	0	0	0	0	0	0	0	0	0	0	0	0
TAUSALA SAMOA	V2FA2	Long Beach	17	57	64	70	67	60	0	0	0	0	0	0	335

Long Beach	Ships: 38	Totals:	1121	1229	1350	1367	1443	1328	0	0	0	0	0	0	7838
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## VOS Cooperative Ship Report

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ALBEMARLE ISLAND	C6LU3	Miami	53	43	41	18	32	18	0	0	0	0	0	0	205
ANASTASIS	9HOZ	Miami	0	0	5	0	0	2	0	0	0	0	0	0	7
ARIZONA VOYAGER	KGBE	Miami	0	0	0	0	21	16	0	0	0	0	0	0	37
BARRINGTON ISLAND	C6QK	Miami	46	40	60	64	62	43	0	0	0	0	0	0	315
BERING SEA	C6YY	Miami	0	0	13	22	21	3	0	0	0	0	0	0	59
CARIBBEAN MERCY	3FFU4	Miami	2	0	0	1	0	0	0	0	0	0	0	0	3
CARNIVAL LEGEND	H3VT	Miami	0	0	0	0	11	1	0	0	0	0	0	0	12
CARNIVAL PARADISE	3FOB5	Miami	19	14	12	1	8	13	0	0	0	0	0	0	67
CARNIVAL PRIDE	H3VU	Miami	0	3	8	2	3	0	0	0	0	0	0	0	16
CARNIVAL TRIUMPH	C6FN5	Miami	0	0	0	2	12	11	0	0	0	0	0	0	25
CARNIVAL VICTORY	3FFL8	Miami	9	12	8	0	25	28	0	0	0	0	0	0	82
CELTIC SEA	C6RT	Miami	81	57	64	19	0	0	0	0	0	0	0	0	221
CHARLES ISLAND	C6JT	Miami	25	0	0	1	40	40	0	0	0	0	0	0	106
CHIQUITA BREMEN	ZCBC5	Miami	0	30	44	29	36	33	0	0	0	0	0	0	172
CORAL SEA	C6YW	Miami	0	0	26	11	14	11	0	0	0	0	0	0	62
DUNCAN ISLAND	C6JS	Miami	55	44	25	27	32	21	0	0	0	0	0	0	204
ELATION	3FOC5	Miami	0	0	2	24	42	35	0	0	0	0	0	0	103
EXPLORER OF THE SEAS	ELWX5	Miami	66	363	472	429	458	404	0	0	0	0	0	0	2192
FASCINATION	C6FM9	Miami	0	12	4	0	0	0	0	0	0	0	0	0	16
GALAXY	C6FU6	Miami	3	3	6	11	8	0	0	0	0	0	0	0	31
JOHANNES MAERSK	OWFD2	Miami	37	44	48	19	14	20	0	0	0	0	0	0	182
MAASDAM	PFRO	Miami	4	58	69	52	4	9	0	0	0	0	0	0	196
MARIT MAERSK	OZFC2	Miami	0	0	3	0	0	0	0	0	0	0	0	0	3
MEKONG PIONEER	V2JN	Miami	79	6	19	57	16	0	0	0	0	0	0	0	177
NAVIGATOR OF THE SEAS	C6FU4	Miami	38	32	23	13	11	2	0	0	0	0	0	0	119
NOVA TERRA	C6IZ7	Miami	0	0	9	12	25	44	0	0	0	0	0	0	90
OLIVIA MAERSK	OXKO2	Miami	32	15	17	61	32	23	0	0	0	0	0	0	180
RYNDAM	PHFV	Miami	0	0	12	1	0	0	0	0	0	0	0	0	13
SEALAND METEOR	MCDW3	Miami	0	0	9	31	22	21	0	0	0	0	0	0	83
STATENDAM	PHSG	Miami	16	13	9	14	4	4	0	0	0	0	0	0	60
VOYAGER OF THE SEAS	C6SE5	Miami	0	0	1	4	0	0	0	0	0	0	0	0	5
ZIM KOREA	4XGU	Miami	0	0	0	23	13	0	0	0	0	0	0	0	36
Miami	Ships: 32	Totals:	565	789	1009	948	966	802	0	0	0	0	0	0	5079

# VOS Cooperative Report



Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
APL TOPAZ	9VID2	New York City	0	0	0	0	0	1	0	0	0	0	0	0	1
ARA J	V2JH	New York City	0	0	0	14	72	45	0	0	0	0	0	0	131
ARCTIC OCEAN	C6T2062	New York City	0	0	0	0	23	29	0	0	0	0	0	0	52
ARGONAUT	KFDV	New York City	37	17	0	0	19	15	0	0	0	0	0	0	88
ATLANTIC OCEAN	C6T2064	New York City	20	23	36	26	25	21	0	0	0	0	0	0	151
BARENTS SEA	9VAP5	New York City	0	0	29	49	51	45	0	0	0	0	0	0	174
BRASILIA	DGVS	New York City	0	0	0	0	18	15	0	0	0	0	0	0	33
CMA CGM KINGSTON	A8CS3	New York City	0	0	0	0	3	59	0	0	0	0	0	0	62
EMPIRE STATE	KKFW	New York City	0	0	0	0	24	27	0	0	0	0	0	0	51
ENDEAVOR	WAUW	New York City	40	54	38	29	41	31	0	0	0	0	0	0	233
ENDURANCE	WAUU	New York City	5	46	56	18	14	35	0	0	0	0	0	0	174
ENTERPRISE	WAUY	New York City	64	35	25	96	62	30	0	0	0	0	0	0	312
EURO SPIRIT	ELUW8	New York City	0	0	0	9	12	15	0	0	0	0	0	0	36
EVER DECENT	3FU07	New York City	0	0	0	0	12	2	0	0	0	0	0	0	14
EVER DEVELOP	3FLF8	New York City	2	0	0	0	0	0	0	0	0	0	0	0	2
EVER DIADEM	3FOF8	New York City	1	0	0	0	0	0	0	0	0	0	0	0	1
EVER REACH	3FQ04	New York City	0	10	10	21	13	19	0	0	0	0	0	0	73
GREEN POINT	WCY4148	New York City	34	27	29	30	37	7	0	0	0	0	0	0	164
HORIZON HAWAII	KIRF	New York City	72	47	72	75	67	50	0	0	0	0	0	0	383
HORIZON PRODUCER	WJBJ	New York City	17	84	75	70	71	61	0	0	0	0	0	0	378
HYUNDAI GRACE	9VVD	New York City	0	0	23	14	0	2	0	0	0	0	0	0	39
INDIAN OCEAN	C6T2063	New York City	28	27	16	48	55	16	0	0	0	0	0	0	190
ITB GROTON	KMJL	New York City	39	38	27	20	12	71	0	0	0	0	0	0	207
JENS MAERSK	OYYK2	New York City	38	37	42	44	34	37	0	0	0	0	0	0	232
JEPPESEN MAERSK	OWTW2	New York City	0	0	0	0	10	26	0	0	0	0	0	0	36
LNG LEO	V7BX2	New York City	0	9	64	73	26	13	0	0	0	0	0	0	185
LNG TAURUS	V7BX4	New York City	0	15	67	62	62	58	0	0	0	0	0	0	264
LNG VIRGO	V7BX5	New York City	0	0	0	0	60	77	0	0	0	0	0	0	137
MACKINAC BRIDGE	JKES	New York City	55	47	44	44	53	52	0	0	0	0	0	0	295
MAERSK GEORGIA	WAHP	New York City	0	0	0	0	12	17	0	0	0	0	0	0	29
MAERSK NANTES	V2007	New York City	0	0	0	0	0	9	0	0	0	0	0	0	9
MAERSK NEWARK	A8CF2	New York City	0	1	43	25	35	22	0	0	0	0	0	0	126
MAGLEBY MAERSK	OUH2	New York City	14	41	10	51	25	24	0	0	0	0	0	0	165
MAJESTIC MAERSK	OUJH2	New York City	40	26	42	32	43	27	0	0	0	0	0	0	210
MANUKAI	WRGD	New York City	47	30	41	43	34	28	0	0	0	0	0	0	223
MARIE MAERSK	OULL2	New York City	0	39	6	29	20	32	0	0	0	0	0	0	126
MARIELLE BOLTEN	ELZH9	New York City	0	0	0	0	41	37	0	0	0	0	0	0	78
MARTORELL	HPNE	New York City	0	0	0	0	40	52	0	0	0	0	0	0	92
MAURICE EWING	WLDZ	New York City	0	11	0	17	71	29	0	0	0	0	0	0	128
MC-KINNEY MAERSK	OUZW2	New York City	34	7	7	10	15	12	0	0	0	0	0	0	85
MSC FEDERICA	C4LV	New York City	0	0	0	0	7	6	0	0	0	0	0	0	13
MSC INSA	3FWO5	New York City	0	0	0	0	0	22	0	0	0	0	0	0	22
MSC JESSICA	H3YF	New York City	0	0	0	0	2	27	0	0	0	0	0	0	29
NOAA SHIP DELAWARE II	KNBD	New York City	28	93	68	156	92	45	0	0	0	0	0	0	482
OLEANDER	PJJU	New York City	0	1	10	15	3	0	0	0	0	0	0	0	29
OLUF MAERSK	OXFU2	New York City	33	6	30	12	14	20	0	0	0	0	0	0	115
OOCL FAITH	VRWG6	New York City	0	0	0	0	40	25	0	0	0	0	0	0	65
PINE ARROW	C6NZ3	New York City	0	0	0	0	0	61	0	0	0	0	0	0	61
SAFMARINE GONUBIE	DGVB	New York City	0	0	0	0	4	1	0	0	0	0	0	0	5
SAFMARINE ZAMBEZI	A8CE9	New York City	0	0	0	0	0	18	0	0	0	0	0	0	18
T/V ENTERPRISE	KVMU	New York City	15	74	0	0	0	0	0	0	0	0	0	0	89
T/V STATE OF MAINE	WCAH	New York City	0	0	0	0	15	54	0	0	0	0	0	0	69
ZIM AMERICA	4XGR	New York City	36	0	44	15	0	27	0	0	0	0	0	0	122
ZIM ASIA	4XFB	New York City	0	59	0	0	0	0	0	0	0	0	0	0	59
New York City Ships: 54	Totals:		699	904	954	1147	1389	1454	0	0	0	0	0	0	6547



# VOS Cooperative Ship Report

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ATLANTIC FOREST	WDB2122	New Orleans	37	26	2	0	3	5	0	0	0	0	0	0	73
BERNARDO QUINTANA A	C6KJ5	New Orleans	82	73	69	45	49	55	0	0	0	0	0	0	373
CAPT STEVEN L BENNETT	KAXO	New Orleans	8	0	10	5	3	0	0	0	0	0	0	0	26
CARNIVAL CONQUEST	3FPQ9	New Orleans	12	8	12	10	15	8	0	0	0	0	0	0	65
DISCOVERER DEEP SEAS	HP9685	New Orleans	53	42	35	46	47	51	0	0	0	0	0	0	274
DISCOVERER ENTERPRISE	3FZQ7	New Orleans	9	15	20	23	17	23	0	0	0	0	0	0	107
HOLIDAY	C6FM6	New Orleans	0	0	0	0	18	12	0	0	0	0	0	0	30
JUDY LITRICO	KCKB	New Orleans	2	26	46	45	38	4	0	0	0	0	0	0	161
LIBERTY GLORY	WADP	New Orleans	0	0	20	8	0	0	0	0	0	0	0	0	28
LIBERTY GRACE	WADN	New Orleans	0	0	16	0	0	0	0	0	0	0	0	0	16
LIBERTY SPIRIT	WCPU	New Orleans	31	16	25	38	44	46	0	0	0	0	0	0	200
LIBERTY STAR	WCBP	New Orleans	0	0	1	26	40	15	0	0	0	0	0	0	82
LIBERTY SUN	WCOB	New Orleans	56	23	0	33	11	0	0	0	0	0	0	0	123
M/V ASPHALT COMMANDER	WFJN	New Orleans	0	0	0	0	0	0	0	0	0	0	0	0	0
MT VIRGO VOYAGER	C6FG8	New Orleans	7	4	11	21	13	0	0	0	0	0	0	0	56
MV MONTAUK	WDCJ	New Orleans	12	26	51	47	28	0	0	0	0	0	0	0	164
NOAA SHIP OREGON II	WTD0	New Orleans	0	0	0	0	95	52	0	0	0	0	0	0	147
NOAA SHIP RONALD H BROWN	WTEC	New Orleans	0	22	65	39	108	76	0	0	0	0	0	0	310
NOAAS GORDON GUNTER	WTEO	New Orleans	63	70	43	117	151	115	0	0	0	0	0	0	559
POLAR DISCOVERY	WACW	New Orleans	10	14	10	8	14	17	0	0	0	0	0	0	73
POLAR ENDEAVOUR	WCAJ	New Orleans	26	18	34	8	0	9	0	0	0	0	0	0	95
POLAR RESOLUTION	WDJK	New Orleans	55	57	51	24	27	58	0	0	0	0	0	0	272
ROGER REVELLE	KAOU	New Orleans	97	39	70	10	35	43	0	0	0	0	0	0	294
SHEILA MCDEVITT	WDA4069	New Orleans	23	22	12	3	2	3	0	0	0	0	0	0	65
WILSON	WNPD	New Orleans	36	16	27	20	28	33	0	0	0	0	0	0	160
ZIM ITALIA	4XGT	New Orleans	0	47	0	4	65	0	0	0	0	0	0	0	116
New Orleans Ships: 26			Totals:	619	564	630	580	851	625	0	0	0	0	0	3869

# VOS Cooperative Ship Report



Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2ND LT. JOHN P. BOBO	WJKH	Norfolk	0	0	0	21	32	1	0	0	0	0	0	0	54
ADVANTAGE	WPPO	Norfolk	0	0	0	0	34	65	0	0	0	0	0	0	99
ALKIN KALKAVAN	TCQP	Norfolk	0	0	0	6	34	38	0	0	0	0	0	0	78
APL ALMANDINE	9VBS	Norfolk	0	0	0	0	0	10	0	0	0	0	0	0	10
ATLANTIC CARTIER	SCKB	Norfolk	49	34	37	42	42	24	0	0	0	0	0	0	228
BESIRE KALKAVAN	TCAO	Norfolk	0	0	0	18	0	0	0	0	0	0	0	0	18
CAP SAN ANTONIO	ELZU6	Norfolk	15	13	7	12	22	21	0	0	0	0	0	0	90
CHESAPEAKE BAY	WMLH	Norfolk	42	70	44	24	31	51	0	0	0	0	0	0	262
COLUMBUS CANADA	P3RD8	Norfolk	22	18	21	17	29	3	0	0	0	0	0	0	110
COLUMBUS VICTORIA	P3RF8	Norfolk	21	12	21	16	19	59	0	0	0	0	0	0	148
CONTI MALACA	DGVZ	Norfolk	43	41	28	49	30	35	0	0	0	0	0	0	226
CONSHIP ROME	ELVZ6	Norfolk	7	28	13	28	30	18	0	0	0	0	0	0	124
COSCO NORFOLK	P3ZY6	Norfolk	6	4	2	12	14	33	0	0	0	0	0	0	71
CSCL XIAMEN	A8CL6	Norfolk	10	15	28	26	0	0	0	0	0	0	0	0	79
DELAWARE BAY	WMLG	Norfolk	21	8	12	27	30	13	0	0	0	0	0	0	111
DIRECT TUI	ELVZ5	Norfolk	85	68	77	37	66	34	0	0	0	0	0	0	367
GEYSIR	WCZ5528	Norfolk	60	115	42	10	30	40	0	0	0	0	0	0	297
INDUSTRIAL CHALLENGER	WDHL	Norfolk	3	0	0	0	0	1	0	0	0	0	0	0	4
JOIDES RESOLUTION	D5BC	Norfolk	27	0	0	0	0	2	0	0	0	0	0	0	29
LEYLA KALKAVAN	TCCJ7	Norfolk	15	21	12	0	0	0	0	0	0	0	0	0	48
MAERSK MISSOURI	WAHV	Norfolk	48	39	40	18	2	20	0	0	0	0	0	0	167
MAERSK VIRGINIA	WAHK	Norfolk	0	0	0	0	2	0	0	0	0	0	0	0	2
MSC SPAIN	DNKL	Norfolk	0	0	0	0	0	2	0	0	0	0	0	0	2
NOAA SHIP ALBATROSS IV	WMVF	Norfolk	4	69	67	70	73	14	0	0	0	0	0	0	297
NOAA SHIP NANCY FOSTER	WTER	Norfolk	0	35	12	60	53	26	0	0	0	0	0	0	186
NOAA SHIP THOMAS JEFFERS	WTEA	Norfolk	0	0	1	32	26	34	0	0	0	0	0	0	93
OOCL FORTUNE	VRWF2	Norfolk	0	0	0	13	34	39	0	0	0	0	0	0	86
ORKUN KALKAVAN	TCCG6	Norfolk	31	23	7	0	0	0	0	0	0	0	0	0	61
P&O NEDLLOYD DAMMAM	A8CA3	Norfolk	4	0	0	0	0	0	0	0	0	0	0	0	4
SEALAND COMET	MCDZ7	Norfolk	15	45	17	18	23	22	0	0	0	0	0	0	140
SEALAND FREEDOM	V7AM3	Norfolk	0	0	0	7	25	11	0	0	0	0	0	0	43
SEALAND INTREPID	9VWZ	Norfolk	21	16	21	31	30	9	0	0	0	0	0	0	128
SELMA KALKAVAN	TCSX	Norfolk	21	48	36	23	19	17	0	0	0	0	0	0	164
STAR GEIRANGER	LAKQ5	Norfolk	31	34	0	33	36	0	0	0	0	0	0	0	134
STAR GRINDANGER	LAKR5	Norfolk	5	44	9	0	22	26	0	0	0	0	0	0	106
STRONG PATRIOT	WCZ8589	Norfolk	0	10	34	2	25	1	0	0	0	0	0	0	72
TAMESIS	LAOL5	Norfolk	18	13	11	0	6	0	0	0	0	0	0	0	48
Norfolk	Ships: 37	Totals:	624	823	599	652	819	669	0	0	0	0	0	0	4186



# VOS Cooperative Ship Report

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
APL TOURMALINE	9VVP	Oakland	24	16	16	49	29	38	0	0	0	0	0	0	172
APL TURQUOISE	9VVY	Oakland	13	11	41	15	37	15	0	0	0	0	0	0	132
CHIEF GADAO	WEZD	Oakland	0	0	2	0	0	0	0	0	0	0	0	0	2
COLORADO VOYAGER	KLHZ	Oakland	13	9	1	11	13	23	0	0	0	0	0	0	70
FRANK A. SHRONTZ	C6PZ3	Oakland	9	31	4	12	8	70	0	0	0	0	0	0	134
GOLDEN BEAR	NMRY	Oakland	0	0	0	0	78	58	0	0	0	0	0	0	136
GREEN COVE	WCZ9380	Oakland	1	39	14	0	2	0	0	0	0	0	0	0	56
HORIZON ENTERPRISE	KRGB	Oakland	574	585	551	619	706	498	0	0	0	0	0	0	3533
HORIZON SPIRIT	WFLG	Oakland	66	53	54	11	37	53	0	0	0	0	0	0	274
HORIZON TRADER	KIRH	Oakland	57	62	48	48	40	33	0	0	0	0	0	0	288
LIHUE	WTST	Oakland	50	39	0	11	1	0	0	0	0	0	0	0	101
LURLINE	WLVD	Oakland	10	10	22	15	7	0	0	0	0	0	0	0	64
MADISON MAERSK	OVB2	Oakland	44	38	38	14	32	19	0	0	0	0	0	0	185
MAERSK DAMMAM	V2OE3	Oakland	49	14	0	0	28	27	0	0	0	0	0	0	118
MAHIMAH	WHRN	Oakland	47	40	51	60	55	29	0	0	0	0	0	0	282
MANOA	KDBG	Oakland	45	56	42	39	56	58	0	0	0	0	0	0	296
MARINE COLUMBIA	KLKZ	Oakland	62	50	65	65	56	49	0	0	0	0	0	0	347
MATSONIA	KHRC	Oakland	16	41	43	21	7	15	0	0	0	0	0	0	143
MAYVIEW MAERSK	OWEB2	Oakland	25	29	31	26	9	26	0	0	0	0	0	0	146
MOKIHANA	WNRD	Oakland	50	43	46	60	64	61	0	0	0	0	0	0	324
MOKU PAHU	WBWK	Oakland	1	31	38	46	41	16	0	0	0	0	0	0	173
MOL VIGOR	9VVN	Oakland	0	1	13	7	13	4	0	0	0	0	0	0	38
OOCL HONG KONG	VRVA5	Oakland	29	18	35	40	33	26	0	0	0	0	0	0	181
PHOENIX VOYAGER	C6QE3	Oakland	28	5	0	0	0	0	0	0	0	0	0	0	33
REGULUS VOYAGER	C6FE6	Oakland	0	0	35	58	42	48	0	0	0	0	0	0	183
RICHARD H MATZKE	C6FE5	Oakland	9	42	31	15	47	32	0	0	0	0	0	0	176
SEALAND CHAMPION	MCDZ2	Oakland	40	10	6	0	3	3	0	0	0	0	0	0	62
SEA-LAND DEFENDER	KGJB	Oakland	49	44	49	0	17	19	0	0	0	0	0	0	178
SEALAND INNOVATOR	WGKF	Oakland	40	48	47	61	70	54	0	0	0	0	0	0	320
SEALAND LIBERATOR	KHRP	Oakland	41	57	41	0	0	0	0	0	0	0	0	0	139
SEALAND MERCURY	MCDW9	Oakland	26	26	30	31	37	32	0	0	0	0	0	0	182
SEA-LAND PATRIOT	KHRF	Oakland	53	63	12	41	50	54	0	0	0	0	0	0	273
VIRGINIAN	KSPH	Oakland	0	20	22	48	58	34	0	0	0	0	0	0	182
WASHINGTON VOYAGER	KFDB	Oakland	1	10	5	8	5	5	0	0	0	0	0	0	34
Oakland Ships: 34		Totals:	1472	1541	1433	1431	1681	1399	0	0	0	0	0	0	8957

# VOS Cooperative Ship Report



Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
A.P. MOLLER	OVYQ2	Seattle	0	44	18	0	0	0	0	0	0	0	0	0	62
APL SPINEL	9VVK	Seattle	0	0	24	10	0	0	0	0	0	0	0	0	34
APL JAPAN	S6TS	Seattle	74	99	98	95	67	81	0	0	0	0	0	0	514
APL KENNEDY	9VAY4	Seattle	53	45	36	51	70	54	0	0	0	0	0	0	309
AXEL MAERSK	OUUY2	Seattle	76	3	0	0	0	0	0	0	0	0	0	0	79
BLUE GEMINI	3FPA6	Seattle	6	64	56	22	62	14	0	0	0	0	0	0	224
CHANG JIANG BRIDGE	3EZJ9	Seattle	56	42	48	54	36	21	0	0	0	0	0	0	257
CHARLOTTE MAERSK	OWLD2	Seattle	0	55	9	0	30	17	0	0	0	0	0	0	111
CHASTINE MAERSK	OZZB2	Seattle	0	0	57	25	0	0	0	0	0	0	0	0	82
CHEVRON LONDON	ELYX	Seattle	0	0	5	7	2	0	0	0	0	0	0	0	14
CLEMENTINE MAERSK	OUQK2	Seattle	7	0	26	6	0	17	0	0	0	0	0	0	56
COASTAL MERCHANT	WCV8696	Seattle	0	0	0	2	0	2	0	0	0	0	0	0	4
COASTAL NAVIGATOR	WCY9686	Seattle	0	2	0	0	3	5	0	0	0	0	0	0	10
COASTAL SEA	WCA7944	Seattle	0	0	3	0	3	4	0	0	0	0	0	0	10
COLUMBINE MAERSK	OUHC2	Seattle	0	65	2	0	29	0	0	0	0	0	0	0	96
CORMORANT ARROW	C6IO9	Seattle	52	25	5	27	26	23	0	0	0	0	0	0	158
CORNELIA MAERSK	OWWS2	Seattle	21	0	38	23	0	14	0	0	0	0	0	0	96
CSL CABO	D5XH	Seattle	22	19	19	20	23	19	0	0	0	0	0	0	122
EASTERN DIAMOND	HODT	Seattle	0	0	1	3	2	0	0	0	0	0	0	0	6
EVER GRADE	3FOW2	Seattle	18	13	15	17	15	11	0	0	0	0	0	0	89
EVER ULTRA	3FEJ6	Seattle	7	3	0	0	0	0	0	0	0	0	0	0	10
EVER UNION	3FFG7	Seattle	0	0	0	8	2	0	0	0	0	0	0	0	10
EVER URANUS	3FCA9	Seattle	0	4	0	0	0	2	0	0	0	0	0	0	6
GOLDEN NOVA	3FDV6	Seattle	12	18	3	26	22	23	0	0	0	0	0	0	104
GREAT LAND	WFDP	Seattle	65	2	0	1	8	0	0	0	0	0	0	0	76
HATSU EAGLE	ZNZH6	Seattle	0	0	0	1	0	0	0	0	0	0	0	0	1
HATSU ELITE	VSJG7	Seattle	11	11	4	9	13	12	0	0	0	0	0	0	60
HATSU ENVOY	VSQJ9	Seattle	51	59	23	61	68	11	0	0	0	0	0	0	273
HATSU ETHIC	VQFS4	Seattle	41	58	50	60	75	52	0	0	0	0	0	0	336
HATSU EXCEL	V5XV3	Seattle	14	20	12	13	13	14	0	0	0	0	0	0	86
HORIZON EXPEDITION	WPGJ	Seattle	0	0	0	55	19	0	0	0	0	0	0	0	74
IBIS ARROW	C6CU6	Seattle	21	30	0	0	0	0	0	0	0	0	0	0	51
ISLA DE CEDROS	VRXU2	Seattle	87	71	77	78	20	55	0	0	0	0	0	0	388
IWANUMA MARU	3ESU8	Seattle	0	0	0	0	93	0	0	0	0	0	0	0	93
KAPITAN AFANASYEV	UFIL	Seattle	0	0	0	7	61	38	0	0	0	0	0	0	106
KURE	3FGN3	Seattle	22	0	0	0	0	0	0	0	0	0	0	0	22
LT UNITY	3FCD9	Seattle	3	0	2	2	0	0	0	0	0	0	0	0	7
MAERSK SUN	S6ES	Seattle	0	0	41	0	0	0	0	0	0	0	0	0	41
MAHARASHTRA	VTSQ	Seattle	0	0	17	18	3	12	0	0	0	0	0	0	50
MIDNIGHT SUN	WAHG	Seattle	48	57	30	52	43	36	0	0	0	0	0	0	266
NATHANIEL B. PALMER	WBP3210	Seattle	71	33	0	0	0	0	0	0	0	0	0	0	104
NOAA SHIP MCARTHUR II	WTEJ	Seattle	0	23	123	160	136	20	0	0	0	0	0	0	462
NOAA SHIP MILLER FREEMAN	WTDMM	Seattle	0	0	46	85	106	138	0	0	0	0	0	0	375
NOAA SHIP RAINIER	WTEF	Seattle	0	0	0	0	0	8	0	0	0	0	0	0	8
NORDMAX	P3YS5	Seattle	36	0	0	0	0	0	0	0	0	0	0	0	36
NORTH STAR	KIYI	Seattle	48	29	54	57	73	96	0	0	0	0	0	0	357
OOCL CALIFORNIA	VRWC8	Seattle	24	28	26	38	14	20	0	0	0	0	0	0	150
ORIENTE CREST	HPFA	Seattle	0	0	5	12	0	0	0	0	0	0	0	0	17
ORIENTE GRACE	3FHT4	Seattle	0	27	39	0	0	0	0	0	0	0	0	0	66
ORIENTE NOBLE	3FVF5	Seattle	0	0	0	0	16	0	0	0	0	0	0	0	16
ORIENTE PRIME	3FOU4	Seattle	0	0	0	0	35	2	0	0	0	0	0	0	37
ORIENTE SHINE	H9AL	Seattle	0	21	10	6	0	0	0	0	0	0	0	0	37
ORIENTE VICTORIA	3FVG8	Seattle	0	24	17	0	0	0	0	0	0	0	0	0	41
PENANG SENATOR	DQVH	Seattle	51	29	67	73	54	45	0	0	0	0	0	0	319
PRESIDENT ADAMS	WRYW	Seattle	55	115	74	65	51	50	0	0	0	0	0	0	410
PRESIDENT JACKSON	WRYC	Seattle	81	56	30	85	52	45	0	0	0	0	0	0	349
PRESIDENT POLK	WRYD	Seattle	61	152	51	33	24	45	0	0	0	0	0	0	366
PRESIDENT TRUMAN	WNDP	Seattle	66	51	29	36	67	29	0	0	0	0	0	0	278



## VOS Cooperative Ship Report

PUSAN SENATOR	DQVG	Seattle	24	33	13	8	14	1	0	0	0	0	0	0	93
RUBIN ARTEMIS	3FAH7	Seattle	29	33	17	18	22	17	0	0	0	0	0	0	136
RUBIN PEARL	YJQA8	Seattle	0	27	70	54	36	47	0	0	0	0	0	0	234
SALLY MAERSK	OZHS2	Seattle	57	0	2	86	0	0	0	0	0	0	0	0	145
SANTA BARBARA	ELOT3	Seattle	40	21	25	17	27	15	0	0	0	0	0	0	145
SHIRAOI MARU	3ECM7	Seattle	0	0	0	0	0	13	0	0	0	0	0	0	13
SINE MAERSK	OZOK2	Seattle	0	40	0	8	34	0	0	0	0	0	0	0	82
SKAUGRAN	LADB2	Seattle	18	48	42	65	10	0	0	0	0	0	0	0	183
SOFIE MAERSK	OZUN2	Seattle	0	0	0	43	19	0	0	0	0	0	0	0	62
SOROE MAERSK	OYKJ2	Seattle	37	28	0	0	25	10	0	0	0	0	0	0	100
SOVEREIGN MAERSK	OYGA2	Seattle	0	0	0	11	21	0	0	0	0	0	0	0	32
STAR DOVER	LAEP4	Seattle	43	0	0	42	0	30	0	0	0	0	0	0	115
STELLAR VOYAGER	C6FV4	Seattle	0	9	35	33	17	21	0	0	0	0	0	0	115
SUSAN MAERSK	OYIK2	Seattle	2	0	6	1	0	8	0	0	0	0	0	0	17
SVEND MAERSK	OYJS2	Seattle	0	0	0	25	1	0	0	0	0	0	0	0	26
SVENDBORG MAERSK	OZSK2	Seattle	0	19	27	0	13	37	0	0	0	0	0	0	96
THOMAS G. THOMPSON	KTDQ	Seattle	0	20	20	30	40	9	0	0	0	0	0	0	119
UBC SAIKI	P3GY9	Seattle	4	41	50	39	22	21	0	0	0	0	0	0	177
UNITED SPIRIT	ELYB2	Seattle	70	87	66	60	84	71	0	0	0	0	0	0	438
USCGC HEALY WAGB-20	NEPP	Seattle	0	0	2	5	143	119	0	0	0	0	0	0	269
USCGC POLAR SEA (WAGB 11)	NRUO	Seattle	62	64	4	0	0	0	0	0	0	0	0	0	130
USCGC POLAR STAR (WAGB 1)	NBTM	Seattle	114	89	131	52	0	0	0	0	0	0	0	0	386
VLADIVOSTOK	UBXP	Seattle	41	59	71	61	57	49	0	0	0	0	0	0	338
WECOMA	WSD7079	Seattle	0	28	4	1	78	89	0	0	0	0	0	0	200
WESTWARD VENTURE	KHJB	Seattle	0	0	13	9	26	0	0	0	0	0	0	0	48
WESTWOOD ANETTE	C6QO9	Seattle	30	7	3	4	21	13	0	0	0	0	0	0	78
WESTWOOD BORG	LAON4	Seattle	72	73	48	64	61	31	0	0	0	0	0	0	349
WESTWOOD BREEZE	LAOT4	Seattle	46	14	21	8	12	7	0	0	0	0	0	0	108
WESTWOOD COLUMBIA	C6SI4	Seattle	38	38	24	27	20	25	0	0	0	0	0	0	172
WESTWOOD MARIANNE	C6QD3	Seattle	63	45	42	69	52	48	0	0	0	0	0	0	319
WESTWOOD RAINIER	C6SI3	Seattle	56	24	27	11	48	20	0	0	0	0	0	0	186
WESTWOOD VICTORIA	C6SI6	Seattle	49	41	41	41	39	45	0	0	0	0	0	0	256
WORLD SPIRIT	ELWG7	Seattle	22	60	49	21	37	29	0	0	0	0	0	0	218

Seattle Ships: 91 Totals: 2177 2345 2143 2316 2415 1810 0 0 0 0 0 0 0 13206

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
BULWARK	WBN4113	Valdez	0	0	0	0	0	0	0	0	0	0	0	0	0
POLAR ALASKA	KSBK	Valdez	27	9	21	9	7	9	0	0	0	0	0	0	82
POLAR TEXAS	KNFD	Valdez	21	31	27	11	9	18	0	0	0	0	0	0	117
PRINCE WILLIAM SOUND	WSDX	Valdez	0	0	0	0	9	8	0	0	0	0	0	0	17
SEA VOYAGER	WCX9106	Valdez	0	0	0	0	0	0	0	0	0	0	0	0	0

Valdez Ships: 5 Totals: 48 40 48 20 25 35 0 0 0 0 0 0 0 0 216

Total Ships: 592 Totals: 13268 13817 13919 14520 15845 13438 0 0 0 0 0 0 0 84807



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